ORGANIZATIONAL MAINTENANCE

TELEPHONE TERMINAL
AN/TCC-7

This copy is a reprint which includes current pages from Changes 2, 4, and 5.

DEPARTMENTS OF THE ARMY AND THE AIR FORCE
APRIL 1958

WARNING

HIGH VOLTAGE

is used in this

equipment.

DEATH ON CONTACT

may result if safety

precautions

are not observed.

All operating adjustments of this equipment are made with the power on. Be careful when working on the inside of the equipment. Be careful not to contact the high-voltage connections or the 115-volt input connections.

The spiral-four cable in a system using unattended repeaters normally carries 100 milliamperes of current at high voltage. Do not disconnect or handle cable connectors unless power has been removed from the cable.

EXTREMELY DANGEROUS POTENTIALS EXIST IN THE FOLLOWING UNITS:

Power Supply PP-826/U (600 volts)

Power Supply PP-826A/U (600 volts)

and

Power Supply PP-827/U (200 volts)

DON'T TAKE CHANCES

TM 11 2139-20
TO 31W1-2TCC7-54
***C5**

Change
No. 5 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 16 December 1983

ORGANIZATIONAL MAINTENANCE TERMINALS, TELEPHONE AN/TCC-7 (NSN 5805-00-503-1228) AND AN/TCC-50 (NSN 5805-00-752-5588)

TM 11-2139-20/TO 31W1-2TCC7-54, 1 April 1958, is changed as follows:

Cover. The title of the cover is changed as shown above.

Page 2. Paragraph 1d. Delete subparagraph d. Add paragraph 1.1 after paragraph 1.

1.1. Consolidated Index of Army Publications and Blank Forms
Refer to the latest issue of DA Pam 310-1 to determine whether there are new editions, changes or additional publications pertaining to the equipment.
Paragraph 2. Delete paragraph 2 and substitute:

2. Maintenance Forms, Records, and Reports

a. Reports of Maintenance and Unsatisfactory Equipment. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750, The Army Maintenance Management System (Army). Air Force personnel will use AFR 66-1 for maintenance reporting and TO-00-35D54 for unsatisfactory equipment reporting.

b. Report of Packaging and Handling Deficiencies. Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR 735-11-2/DLAR 4140.55/NAVMATINST 4355.73A/AFR 400-54/MCO 4430.3F.

c. Discrepancy in Shipment Report (DISREP)(SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/ NAVSUPINST 4610.33C/AFR 75-18/MCO P4610.19D/ DLAR 4500.15.

Add paragraphs 2.1, 2.2, 2.3 and 2.4 after paragraph 2.

*This change supersedes C3, 22 March 1963.

2.1 Reporting Errors and Recommending Improvements.
You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) direct to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME:-MP, Fort Monmouth, New Jersey 07703.

For Air Force, submit AFTO Form 22 (Technical Order System Publication Improvement Report and Reply) in accordance with paragraph 6-5, Section VI, T.O. 00-5-1. Forward direct to prime ALC/MST.
In either case, a reply will be furnished directly to you.

2.2. Reporting Equipment Improvement Recommendations (EIR)

a. Army. If your telephone terminal needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Put it on an SF 368 (Quality Deficiency Report). Mail it to Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MP, Fort Monmouth, New Jersey 07703. We'll send you a reply.

b. Air Force. Air Force personnel are encouraged to submit EIR's in accordance with AFR 900-4

2.3. Administrative Storage
Administrative Storage of equipment issued to and used by Army activities will have preventive maintenance performed in accordance with the PMCS charts before storing. When removing the equipment
from administrative storage the PMCS should be performed to assure operational readiness. Disassembly and repacking of equipment for shipment or limited storage are covered in chapter 4 and TM 740-90-1.

2.4. Destruction of Army Electronics Materiel

Destruction of Army electronics materiel to prevent enemy use shall be in accordance with TM 750-244-2.

Page 3, paragraph 5a. Add the following note to subparagraph a:

NOTE

Hexagonal wrenches, 1/8 inch and 1/16 inch, are not provided with some GROUP PANELS.

Paragraph 6. Delete paragraph 6 and substitute:

6. Preventive Maintenance

a.. Organizational preventive maintenance procedures are designed to help maintain equipment in serviceable condition. They include items to be checked and how to check them. These checks and services, described in paragraph 6.1, outline inspections that are to be made at specific quarterly (Q) intervals.

b. Routine checks like CLEANING, DUSTING, WASHING, CHECKING FOR FRAYED CABLES, STOWING ITEMS NOT IN USE, COVERING UNUSED RECEPTACLES, CHECKING FOR LOOSE NUTS AND BOLTS AND CHECKING FOR COMPLETENESS are not listed as PMCS checks. They are things that you should do any time you see they must be done. If you find a routine check like one of those listed in your PMCS, it is because other operators reported problems with this item.

NOTE

When you are doing any PMCS or routine checks, keep in mind the warnings and cautions.

WARNINGS

- Adequate ventilation should be provided while using TRICHLOROTRIFLUORO-ETHANE. Prolonged breathing of vapor should be avoided. The solvent should not be used near heat or open flame; the products of decomposition are toxic and irritating. Since TRICHLOROTRIFLU-OROETHANE dissolves natural oils, prolonged contact with skin should be avoided. When necessary, use gloves which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

- Compressed air is dangerous and can cause serious bodily harm if protective means or methods are not observed to prevent a chip or particle (of whatever size) from being blown into the eyes or unbroken skin of the operator or other personnel. Goggles must be worn at all times while cleaning with compressed air. Compressed air shall not be used for cleaning purposes except where reduced to less than 29 pounds per square inch gage (psig) and then only with effective chip guarding and personnel protective equipment. Do not use compressed air to dry parts when TRICHLOROTRIFLU-OROETHANE has been used.

NOTE

If your equipment must be in operation the time, check those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shutdown.

c. Deficiencies that cannot be corrected must be reported to a higher category maintenance personnel. Records and reports of preventive maintenance must be made in accordance with procedures given in TM 38-750.

Add paragraph 6.1 after paragraph 6.

6.1. Organizational Preventive Maintenance Checks and Services Chart

Q-Quarterly

Item No.	Interval	Item to be inspected	Procedures
	Q		
1	•	AN/TCC-7 Telephone Terminal	Accomplish equipment performance check as described in paragraph 80 of TM 11-2139-10-

Page 4. Delete figure 1.

Page 5. Delete figure 2.

Page 43. The title of CHAPTER 4 is changed from "SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE" to "SHIPMENT AND LIMITED STORAGE".

Paragraphs 23 and 24 deleted.

Page 44, appendix 1. Delete appendix 1 and substitute:

APPENDIX I

REFERENCES

DA Pam 310-1	Consolidated Index of Army Publications and Blank Forms.
TM 11-381	Cable Assembly CX-1065/G, Telephone Cable Assemblies CX-1606/G and CX-1512/U; Telephone Loading Coil Assembly CU-260/G;Electrical Connector Plugs U-176/G and U-226/G and Maintenance Kit, Cable Splicing MK-640/G.
TM 11-2139-10	Operators Manual: Terminals, Telephone AN/TCC-7 and AN/TCC-50.
TM 11-2140-10	Operators Manual: Telephone Repeater AN/TCC-8-and Telephone Repeater AN/TCC-21.
TM 11-2140-20	Organizational Maintenance: Telephone Repeater AN/TCC-8 and Telephone Repeater AN/TCC-21.
TM 11-2143	Telephone Test Sets TS-712/TCC-11 and TS-712A/TCC-11.
TM 11-2150	Telephone Carrier Systems Using Terminals, Telephone AN/TCC-7 and AN/-TCC-50; Repeater Telephone AN/TCC-8 (AN/TCC-21); Repeater, Telephone AN/TCC-11 and Telephone Test Set TS-712/TCC-11.
TM 11-5805-224-20P	Organizational Maintenance Repair Parts and Special Tool List: Modem, Telephone TA-219/U (FSN 5805-503-1062).
TM 11-5805-240-12	Operators and Organizational Maintenance Manual: Repeater, Telephone AN/TCC-11.
TM 11-5805-245-20P	Organizational Maintenance Repair Parts and Special Tools List: Power Supply PP-827/U (FSN 5805-500-4436).
TM 11-5805-248-20P	Organizational Maintenance Repair Parts and Special Tools List: Power Supplies PP-826/U and PP-826A/U (FSN 5805-500-4370).
TM 11 -5805-317-20P	Organizational Maintenance Repair Parts and Special Tools List: Telephone Terminals AN/TCC-7 (5805-00-503-1228) and AN/TCC-50 (5805-00-752-5588).
TM 11-5820-287-12	Operator's and Organizational Maintenance Manual: Radio Sets AN/TRC-24 (NSN 5820-00-503-1133), AN/GRC-75 (NSN 5820-00-581-2104), AN/GRC-78 (NSN 5820-00-581-2105), AN/GRC-81 (NSN 5820-00-578-5451), and AN/GRC-81A (NSN 5820-00-578-5451); Radio Terminal Sets AN/TRC-35 (NSN 5820-00-503-2578), AN/GRC-76 (NSN 5820-00-557-6260), AN/GRC-79 (NSN 5820-00-693-9796), and AN/GRC-82 (NSN 5820-00- 578-5413); Radio Relay Set AN/TRC-36 (NSN 5820-00-569-0031); Radio Repeater Sets AN/GRC-77 (NSN 5820-00-557-6259), AN/GRC-80 (NSN 5820-00-561-6680), and AN/GRC-83 (NSN 5820-00-578-5452); and Radio Set Groups AN/TRA-25,(NSN 5820-00-776-5406), AN/TRA-25A (NSN 5820-00-856-9911), and OA-3668A/TRC-24 (NSN 5820-00-082-3214).
TM 11-5965-216-15P	Operator's, Organizational, Field and Depot Maintenance Repair Parts and Special Tools List and Maintenance Allocation Chart: Handset TS-9-F.
TM 38-750	The Army Maintenance Management System (TAMMS).
TM 740-90-1	Administrative Storage of Equipment.
TM 750-244-2	Procedures for Destruction of Electronics Materiel To Prevent Enemy Use.

By Order of the Secretary of the Army:

JOHN A. WICKHAM JR.
General, United States Army
Chief of Staff

Official:

ROBERT M. JOYCE
Major General, United States Army
The Adjutant General

DISTRIBUTION:

To be distributed in accordance with DA Form 12-51A-1, Organizational Maintenance requirements for AN/TCC-20.

TECHNICAL MANUAL
Organizational Maintenance
TERMINALS, TELEPHONE AN/TCC-7 AND AN/TCC-50

TM 11-2139-20
}
CHANGE No. 4

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *17 September 1963*

TM 11-2139-20/TO 31W1-2TCC7-54, 1 April 1958, is hanged as follows:

Note. Parenthetical reference to previous changes example: page 4 of C 2) indicate that that pertinent material was published in that change.

Page 44, appendix I. references. Add the following:

TM 11-2140-20	Organizational Maintenance: Telephone Repeater AN/TCC-8 and Telephone Repeater AN/TCC-21
TM 11-2142	Telephone Terminal AN/TCC-3 and Telephone Terminal AN/TCC-23

Page 47 (page 4 of C 2). Delete Section II and substitute:

Section II. Maintenance Allocation Chart (AN/ TCC-7, AN/TCC-50)

(Page 10 of C 2) column 8, line 4, after "5, 13": add 17. Column 9, line 7, after "continuity," add: "Tube socket voltage test"

(Page 11 of C 2) column 3, line 17: Add "**†**".

(Page 12 of C 2) column 8, line 4, after "5,13" Add "17". Column 9, line 6, after "continuity", add "Tube socket voltage test".

(Page 13 of C 2) column 3, line 17: add "**†**".

(Page 14 of C 2) column 9, line 5, after "facilities": Add "Tube socket voltage test".

SECTION II. MAINTENANCE ALLOCATION CHART

PART OR COMPONENT	MAINTENANCE FUNCTION	ECHELON 1	2	3	4	5	TOOLS REQUIRED	REMARKS
TELEPHONE, TERMINAL AN/TCC-7	service	X						
	adjust	X						Operation adjustments using built-in facilities
			X				14	Line up procedures
				X			3,4,6,14,18	
	inspect	X						Exterior
			X				14	
	test	X						Operating test using built-in facilities
			X				5,11,13,14	Continuity, resistance and voltage tests to determine condition of circuits, test electron tubes
				X			1,3,4,6,7,13,14,17,18	Gain measurements, test output level of carrier frequency supplies and oscillators ,tubes socket voltage test
					X		1,2,3,4,6,7,8,9,10,11	All testing. Tool code 12 replaces tool code 13 in 5th echelon only
	repair		X				14	Replace components only
				X			14	All repairs except oscillator circuits
	align				X		1,2,7,9,10,14,18	Oscillator circuits
	overhaul				X		14	
TELEPHONE TERMINAL AN/TCC-50	service	X						
	adjust	X						Operating adjustments using built-in facilities
			X				14	Line up procedures
				X			3,4,6,14,18	
	inspect	X						Exterior
			X				14	
	test	X						Operating tests using built-infacilities
			X				5,11,13,14	Continuity, voltage and resistance tests to determine condition of' circuits, test electron tubes
				X			1,3,4,6,14,17,18	Gain measurements, tube socket voltages, test output level of carrier frequency supplies and oscillators
					X		1,2,3,4,6,7,8,9,10,11 13,14,15,10,17,18	All testing; tool code 12 replaces tool code 13, in 5th echelon only
	repair	X						Replace components only
			X					All repair except oscillator circuits
	align			X			1,2,7,9,10,14,18	Oscillator circuits
	overhaul			X			14	

PART OR COMPONENT	MAINTENANCE FUNCTION	ECHELON 1	2	3	4	5	TOOLS REQUIRED	REMARKS
AN/TCC-7, AN/TCC-50 (continued)								
AMPLIPIER, PILOT REGULATOR AM-707/TCC-7	service	X						
	adjust	X						
			X				14	Operating adjustments, using built-in facilities
				X			3,4,6,14,18	
	inspect	X						Exterior
			X				14	
	test	X						Operating test, using built-in facilities
			X				5,11,13,14	Continuity, voltage and resistance tests to determine condition of circuits, test electron tubes
				X			1, 3, 4, 6,14,17,18	Make gain measurements, tube socket voltages, test output level of carrier frequency supplies and oscillators
					X		1,3,4,6,7,8,9,10,13 14,15,16,17,18	All testing tool code 12 replaces tool code 13, in 5th echelon only
	replace		X				14	
	repair		X				14	Replace sub-assemblies only
				X			14	
	overhaul				X		14	
AMPLIFIERS, AUDIO-FREQUENCY-RADIO FREQUENCY	test		X				5,11,13,14	Continuity, voltage and resistance tests
	replace		X				14	
	repair			X			14	
AMPLIFIER, PILOT REGULATOR, SUB- ASSSEMBLY	test		X				5,11,13,14	Continuity, voltage and resistance tests
	replace		X				14	
	repair			X			14	
MODEM, TELEPHONE TA-219/U	repair							Refer to TM 11-2142-20
MODEM, TELEPHONE TA-227/U	service	X						
	adjust	X						Operational adjustment using built-in facilities
			X				14	Line up procedures
				X			3,4,6,14,18	
	inspect	X					14	Exterior
			X					
	test	X						Operational test using built-in facilities
			X				5,11,13,14	Continuity, resistance and voltage tests to determine condition of circuits, test electron tubes
				X			1,3,4,6,14,17,18	Make gain measurements tube socket voltage test
					X		1,3,4,6,7,8,9,10,11, 13,14,16,17,18	All testing, tool code 12 replaces tool code 13 in 5th echelon only
	replace		X				14	
	repair			X			14	
	overhaul				X		14	

PART OR COMPONENT	MAINTENANCE FUNCTION	ECHELON 1	2	3	4	5	TOOLS REQUIRED	REMARKS
AN/TCC-7, AN/TCC-50 (continued)								
POWER SUPPLY PP-827/U	repair							Refer to TM 11-2140-20
RECEIVER-TRANSMITTER-TEST SET	service	X						Operating adjustments using built in facilities
GROUP OA-443/TCC-7	adjust	X						
			X				14	Line up procedures
				X			3, 4, 6, 14, 18	
	inspect	X						Exterior
			X				14	
	test	X						Operational tests using built-in facilities
			X				5, 11, 13, 14	Continuity, resistance and voltage test to determine condition of circuits; test electron tubes
				X			1, 3, 4, 6, 14, 17, 17, 18	Gain measurements tube socket voltage tests.
					X		1, 3, 4, 6, 7, 8, 9, 10, 13, 14, 15, 16, 17, 18	All testing; tool code 12 replaces tool code 13 in 5th echelon only
	replace		X				14	
	repair		X				14	Replace assemblies and subassemblies
				X			14	All repairs except oscillator circuits
	calibrate				X		1, 2, 7, 9, 10, 14, 18	Oscillator circuits
	overhaul				X		14	
TEST SET, TELEPHONE TS-760/TCC-7	service	X						
	adjust	X						Operating adjustments
			X				14	Line up procedures
				X			3, 4, 6, 14, 18	
	inspect		X				14	
	test	X						Operating test using built in facilities
			X				5, 11, 13, 14	Test frequency levels and tubes
				X			1, 3, 4, 6, 14, 17, 18	Gain measurements and output levels
					X		1, 3, 4, 6, 7, 8, 9, 10, 13, 14, 16, 17, 18	All testing; tool code 12 replaces tool code 13 in 5th echelon only.
	replace		X				14	
	repair		X				14	Replace subassembly only.
				X			14	All repair except oscillator circuit
	calibrate				X		1, 2, 7, 9, 10, 14, 18	Oscillator circuit
	overhaul				X		14	
TEST SET, SUB ASSEMBLY	test		X				5, 11, 13, 14	Voltage, continuity and resistance
	replace		X				14	
	repair			X			14	

PART OR COMPONENT	MAINTENANCE FUNCTION	ECHELON 1	2	3	4	5	TOOLS REQUIRED	REMARKS
AN/TCC-7, AN/TCC-50 (continued)								
RECEIVER-TRANSMITTER, ORDER WIRE	service	X						
RT-280/TCC-7	adjust	X						Operating adjustments
				X			3,4,6,14,18	
	inspect		X				14	
	test	X						Operating test using built-in facilities
			X				5,11,13,14	Test signal levels carrier frequency using built-in facilities
				X			1,3,4,6,14,17,18	Gain measurements, output levels frequency supplies and oscillator tube sockets
					X		1,3,4;6 7,8,9,10,13, 14,16,17,18	All testing; tool code 12 replaces tool code 13 in 5th echelon only
	replace		X				14	
	repair		X				14	Replace sub-assemblies only
				X			14	
	overhaul				X		14	
HANDSET TS-9-F	repair							Refer to TM 11-5965-216-15P
AMPLIFIER, AUDIO FREQUENCY	test		X				5,11,13,14	Continuity, voltage and resistance
	replace		X				14	
	repair			X			14	
RINGER-OSCILLATOR ASSEMBLY	test		X				5,11,13 14	Continuity, voltage and resistance
	replace		X				14	
	repair			X			14	
TELEPHONE CARRIER TA-228/TCC-7	service	X						
	adjust	X						Operating adjustments using built-in facilities
			X				14	Line up procedures
				X			14	
	inspect	X						
			X				14	
	test	X						Operating test using built-in facilities
			X				5,11,13,14	Test signal level, carrier and test frequency levels. Using built-in facilities; test electron tubes
				X			1,3,4,6,14,17,18	Test output level of carrier frequency supplies and oscillators; gain measurements; tube socket voltages
					X		1,3,4,6,7,8,9,10,13, 14,16,17,18	All testing, tool code 12 replaces tool code 13 in 5th echelon only
	replace		X				14	
	repair			X			14	All repair except oscillator circuits
	calibrate				X		1,2,7,9,10,14,18	Oscillator circuits
	overhaul				X		14	
POWER SUPPLY PP-826/U	repair							Refer to TM 11-2140-20

TOOLS REQUIRED FOR MAINTENANCE FUNCTIONS	ECHELON 1	2	3	4	5	TOOL CODE	REMARKS
AN/TCC-7, AN/TCC-50 (continued)							
ATTENUATOR TS-402/U			†	†	†	1	
FREQUENCY METER AN/TSM-16				†	†	2	
GENERATOR, SIGNAL SG-71/FCC			†	†	†	3	2 required at 4th and 5th echelons
METER, AUDIO LEVEL ME-71/FCC			†	†	†	4	
MULTIMETER.AN/URM-105		†				5	
MULTIMETER TS-352/U			†	†	†	6	
MULTIMETER METER ME-26/U			†	†	†	7	
OSCILLOSCOPE OS-8/U				†	†	8	
POWER SUPPLY PP-827/U				†	†	9	Required for troubleshooting and testing individual components when terminal power supply is not available
TEST FACILITIES KIT, TELEPHONE CARRIER MK-155/TCC				†	†	10	
TEST SET TS-190/U		†	†	†	†	11	
TEST SET, ELECTRON TUBE TV-2/U					†	12	
TEST SET, ELECTRON TUBE TV-7/U		†	†	†		13	
TOOL EQUIPMENT TE-123		†	†	†	†	14	
TRANSFORMER VARIABLE CN-16/V				†	†	15	
TRANSMISSION MEASURING SET TS-559/FT				†	†	16	
TUBE SOCKET ADAPTER KIT MX-1258/U			†	†	†	17	
VOLTMETER, METER ME-30/U			†	†	†	18	

By Order of the Secretary of the Army:

EARLE G. WHEELER,
General, United States Army
Chief of Staff.

Official:

J.C. LAMBERT,
Major General, United States Army,
The Adjutant General.

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USATC Inf (2)
USATC Armor (2)
USASTC (5)
Instl (2) except
Ft Monmouth (65)
Svc Colleges (2)
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GENDEP (OS) (2)
Sig Dep (OS) (12)
Sig Sec, GENDEP (5)
Army Dep (2) except
Ft Worth (8)
Lexington (12)
Sacramento (28)
Tobyhanna (12)
USA Elect RD Actv, White Sands (13)
USA Elct RD Actv, Ft Huachuca (2)
USA Trans Tml Comd (1)
Army Tml (1)
POE (1)
USAOSA (1)
AMS (1)
WRAMC (1)
AFIP (1)
Army Pic Cen (2)
USA Mbl Spt Cen (1)
USA Elct Mat Agcy (12)
Chicago Proc Dist (1)
USARCARIB Sig Agcy (1)
Sig Fld Maint Shop (3)
Units org under fol TOE (2 cy ea UNOINDC):
7
11-5
11-6
11 7
11-16
11-35
11-36
11-38
11-55
11-56
11-57
11-95
11-97
11-98
11-117
11-155
11-157
11-500 (AA-AE) (4)
11-557
11-587
11-592
11-597
17
32-56
32-78
37

NG: State AG (3); units-same as active Army except allowance is one copy to each unit.
USAR: None.
For explanation of abbreviations used, see AR 320-50.

Organizational Maintenance Manual

TERMINALS, TELEPHONE AN/TCC-7 AND AN/TCC-50

TM 11-2139-20
TO 31W1-2TCC7-54
CHANGES No. 2

DEPARTMENTS OF THE ARMY
AND THE AIR FORCE
WASHINGTON 25, D.C., *14 August 1962*

TM 11-2139-20/TO 31E1-2TCC7-54, 1 April 1958, is changed as indicated, so that the manual also applies to Terminal, Telephone AN/TCC-50.

Change the title as shown above.

Page 2. Add the following "Note" below the title of chapter 1:

Note: (Added). Terminal, Telephone AN/TCC-50 and Terminal, Telephone AN/TCC-7 are identical except that Power Supply PP-826(*)/U (600 VOLT POWER SUP-PLY) is not provided as a component of the AN/TCC-50. Information in this manual that applies to the AN/TCC-7 also applies to the AN/TCC-50 except references to the 600 VOLT POWER SUPPLY.

Page 2, paragraph la. Delete lines 6 through 9 and substitute

TM 11-2139-10, Operator's Manual; Terminals, Telephone AN/TCC-7 and AN/ TCC-50.

TM 2139-35, Field and Depot Maintenance Manual; Terminals, Telephone AN/ TCC-7 and AN/TCC-50.

Subparagraph d, line 3. Delete "Publications" and substitute "Materiel Support." After "Agency" add: ATTN: SIGMS-MPP-4.

Paragraph 2. Add the following:

d. Parts List Form (Added). Forward DA Form 2028 (Recommended Changes to DA Technical Manual Parts Lists or Supply Manual 7, 8, or 9) direct to Commanding Officer, U.S. Army Signal Materiel Support Agency, ATTN**:** SIGMS-ML, Fort Monmouth, NJ, with comments on parts listings in appendix II.

Page 3, paragraph 5c (1) . Change "Multimeter ME-77/U or equal" to "Multimeter AN/ URM-106 (TM 11-6625-203-12) or equal and Shunt Instrument Multirange MX-1471/U."

Page 16, paragraph 9b(3), chart. Make the following changes:

Item 3. In the "Symptom (fault or failure) "column, change "62-kc output at TR AMP OUT jack" to "62-kc output at TR 62 KC jack." In the "Test point (jack)" column, change "TR AMP OUT" to "TR 62 KC." In the "Normal indication" column, delete "Less than +5 db or no indication and substitute "Less than- 5 db or no indication*Note.* In the AN/TCC-7's and AN/TCC-50's provided with Telephone Test Set TS-760/TCC-7 (TEST PANEL) on Orders No. 9040-PP-61 and 21423-PC-61 there should be no meter indication or an indication*to tire left of 0 db.*

Item 4. In the "Normal indication" column, delete "Less than-5 db or no indication" and substitute: "Less than-5 db or no indication on local check. Less than +18 db on terminal-to-terminal check. Note. In the AN/TCC-7's and AN/TCC-50's provided with Telephone Test Set TS-760/TCC-7 (TEST PANEL) on Orders No. 9040-PP-61 and 21423-PC-61, the local check reading should be no meter indication or an indication to the left of 0 db."
Page 44, appendix I. Make the following changes:
Delete "TM 11-2140" and substitute:
TM 11-2140-10 Telephone Repeater AN/ TCC-8 and Telephone Repeater AN/ TCC-21; Operator's Manual.

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*These changes supersede C 1, 10 February 1961"

Delete "TM 11-2148" and substitute:
TM 11-580-240-12 Operator's and Organizational Maintenance Manual: Repeater, Telephone AN/TCC-11.Add:
DA Pam 310 - Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders.
TM 11-2139-10 Terminals, Telephone AN/TCC-7 and AN/TCC-50, Operator's Manual.
TM 11-5820-287-10 Operator's Manual: Radio Sets AN/TRC-24, AN/GRC-75, AN/GRC-78, and AN/GRC-81; Radio Terminal Sets AN/TRC-35, AN/GRC-76, AN/GRC-79, and AN/GRC-2; Radio Relay Set AN/TRC-36; Radio Repeater Sets AN/GRC-77, AN/GRC-80, and AN/GRC-3; and Radio Set Group AN/TRA-25.
TM11-596-21-15P Operator, Organizational, Field and Depot Maintenance Repair Parts and Special Tools List and Maintenance Allocation Chart: Handset T-9-F (as added by C1, 17 Feb. 1961).
Page 45. Delete appendix II changed by C 1, 10 February 1961, and substitute the following:

APPENDIX II

MAINTENANCE ALLOCATION CHART

FOR

TERMINALS, TELEPHONE AN/TCC-7 AND AN/TCC-50

(Superseded)

Section I. INTRODUCTION

1. General

a. This appendix assigns maintenance functions to be performed on components, assemblies and subassemblies, by the lowest appropriate maintenance echelon.

b. Columns in the maintenance allocation charts are as follows:

(1) *Part or component.* This column shows only the nomenclature of standard item name. Additional descriptive data are included only where clarification is necessary to identify the component. Components, assemblies, and subassemblies are listed immediately in top-down order. That is, the assemblies which are part of a component are listed immediately below that component, and the subassemblies which are part of the assembly are listed immediately below that assembly. Each generation breakdown (components, assemblies, or subassemblies) are listed in disassembly order or alphabetical order.

(2) Maintenance function. This column lists the various maintenance functions allocated to the echelons.

(a) Service. To clean to preserve**,** and to replenish lubricants.

(b) Adjust. To regulate periodically To prevent malfunction.

(c) Inspect. To verify serviceability and to detect incipient electrical or mechanical failure by scrutiny.

(d) Test. To verify serviceability and to detect incipient electrical or mechanical failures by use of special equipment such as gages, meters, etc.

(e) Replace. To substitute service-able components, assemblies, or subassemblies for unserviceable components, assemblies, or sub-assemblies.

(f) Repair. To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes but is not limited to welding, grinding, riveting, straightening, and replacement of parts other than the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.

(g) Calibrate. To determine, check, or rectify the gradation of an instrument, weapon, or weapons system, or components of a weapon system.

(h) Overhaul. To restore an item to *completely serviceable* condition as prescribed by serviceability standards developed and published by heads of technical services. This is accomplished through employment of the technique of "Inspect and Repair Only as Necessary" (IROAN). Maximum utilization of diagnostic and test equipment is combined with minimum disassembly of the item during the overhaul process.

(3) 1st, 2nd, 3rd, 4th, and 5th echelons. The symbol "X" placed in columns 3 through 7 indicates the echelon responsible for performing that particular maintenance operation, but does not necessarily indicate that repair parts will be stocked at that level. Echelons higher than the echelon marked by "X" are authorized to per-form the indicated operation.

(4) Tools required. This column indicates codes assigned to each individual tool equipment, test equipment, and maintenance equipment referenced. The grouping of codes in this column of the maintenance allocation chart indicates the tool, test, and maintenance equipment required to perform the maintenance function.

(5) Remarks. Entries in this column clarify any of the data cited in the proceeding columns.

c. Columns in the allocation of tools for maintenance functions charts are as follows:

(1) Tools required for maintenance functions. This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

(2) 1st, 2nd, 3rd, 4th, and 5th echelon. The dagger (†) symbol in these columns indicates the echelons normally allocated the facility.

(3) Tool code. This column lists the tool code assigned.

2. Maintenance by Using Organizations

When this equipment is used by signal service organizations organic to theater headquarters or communication zones to provide theater communications, those maintenance functions allocated up to and including fourth echelon are authorized to the organization operating this equipment

SECTION II. MAINTENANCE ALLOCATION CHART (AN/TCC-7, AN/TCC-50)

PART OR COMPONENT	MAINTENANCE FUNCTION	ECHELON 1	2	3	4	5	TOOLS REQUIRED	REMARKS
TELEPHONE, TERMINAL AN/TCC-7; AN/TCC-50								
	service	X						
	adjust	X						Operating Adjustments, Using Built-in facilities.
			X				14	Line up procedures.
				X			3, 4, 6, 14, 18	All adjustments.
	Inspect	X						Exterior
			X				14	
	test	X						Operating Test, Using Built in facilities.
			X				5, 11, 13, 14	Make Continuity, Resistance and voltage tests to determine conditions of Circuits, Test Electron Tubes.
				X			1, 3, 4, 6, 7, 13, 14, 17, 18	Make Gain Measurements, Test output level of carrier Frequency Supplies and Oscillators, Tube Socket Voltage Test.
					X		1, 2, 3, 4, 6-11, 13-18	All testing. Item No. 12 replaces item No. 13 for 5th Echelon only.
	repair		X				14	
	align				X		1, 2, 7, 9, 10, 14, 18	Oscillator Circuits.
	overhaul				X		14	

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PART OR COMPONENT	MAINTENANCE FUNCTION	ECHELON 1	2	3	4	5	TOOLS REQUIRED	REMARKS
AN/TCC-7; AN/TCC-50 (continued)								
AMPLIFIER, PILOT REGULATOR AM-707/TCC-7	service	X						
	adjust	X						Operating Adjustments, Using Built-in facilities.
			X				14	Line up procedures.
				X			3, 4, 6, 14, 18	All Adjustments.
	Inspect	X						Exterior
			X				14	
	test	X						Operating Adjustments, Using Built-in facilities.
			X				5, 11, 13, 14	Make Continuity, Voltage and Resistance Test to determine condition of Circuits, Test Electron Tubes.
				X			1, 3, 4, 6, 14, 17, 18	Make Gain Measurements, Tube Socket Voltages, Test output level of Carrier frequency Supplies and Oscillators.
					X		1, 3, 4, 6 thru 10 13 thru 18	All tests.
	replace		X				14	
	repair		X				14	Replaces Sub-Assemblies
				X			14	
	overhaul			X			14	
AMPLIFIERS, AUDIO FREQUENCY-RADIO FREQUENCY	test		X				5, 11, 13, 14	Continuity, Voltage and Resistance tests.
	replace		X				14	
	repair			X			14	
AMPLIFIER, PILOT REGULATOR, SUB-ASSEMBLY	test		X				5, 11, 13, 14	Continuity, Voltage and Resistance tests.
	replace		X				14	
	repair			X			14	
MODEM TELEPHONE TA-219/U	replace		X					See separate MAC
MODULATOR, SUB-ASSEMBLY	replace		X				14	
	repair			X			14	

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PART OR COMPONENT		MAINTENANCE FUNCTION	ECHELON 1	2	3	4	5	TOOLS REQUIRED	REMARKS
AN/TCC-7; AN/TCC-50 (continued)									
MODEM TELEPHONE TA-227/U		service	X						
		adjust	X						Operating Adjustments, Using Built-in facilities.
				X				14	Line up procedures.
					X			3, 4, 6, 14, 18	All Adjustments.
		inspect	X						Exterior.
				X				14	
		test	X						Operating Adjustments, Using Built-in facilities.
				X				5, 11, 13, 14	Make Continuity, Voltage and Resistance Test to determine condition of Circuits, Test Electron Tubes.
					X			1, 3, 4, 6, 14, 17, 18	Make Gain Measurements, Tube Socket Voltage Tests.
					X			1, 3, 4, 6 thru 10	All testing.
								13 , 14, 16, 17, 18	
		replace		X				14	
		repair			X			14	
		overhaul			X			14	
POWER SUPPLY PP-826/U; PP-826/U		replace		X					See separate MAC.
POWER SUPPLY PP-827/U		replace		X					See separate MAC.
RECEIVER, TRANSMITTER GROUP		service			X				
OA-443/TCC-7		adjust	X						Operating Adjustments, Using Built-in facilities.
				X				14	Line up procedures.
					X			3, 4, 6, 14, 18	All Adjustments.
		inspect	X						Exterior.
				X				14	
		test	X						Operating Adjustments, Using Built-in facilities.
				X				5, 11, 13, 14	Test signal levels, carrier and test frequency levels, using build-in Test facilities. Test Electron Tubes.
					X			1, 3, 4, 6, 14, 17, 18	Make Gain Measurements, Test output level of Carrier Frequency Supplies and Oscillators, Tube Socket Voltage..
					X			1, 3, 4, 6 thru 10	All testing.
								13 , 14, 16, 17, 18	
		replace		X				14	
		repair		X				14	Replace assemblies and sub-assemblies.
		repair			X			14	
		calibrate			X			1, 2, 7, 9, 10, 14, 18	Oscillator Circuits.
		overhaul			X			14	

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PART OR COMPONENT	MAINTENANCE FUNCTION	ECHELON 1	2	3	4	5	TOOLS REQUIRED	REMARKS
AN/TCC-7; AN/TCC-50 (continued)								
RECEIVER-TRANSMITTER RT-280/TCC-7	service						X	
	adjust	X						Operating adjustments.
				X			3, 4, 6, 14, 18	All Adjustments.
	inspect		X				14	
	test	X						Operating tests using Built-in facilities.
			X				5, 11, 13, 14	Test signal levels carrier frequency levels, using build-in facilities.
				X			1, 3, 4, 6, 14, 17, 18	Gain Measurements, output levels, frequency supplies and Oscillator, Tube Socket.
					X		1, 3, 4, 6 thru 10	All tests.
							13 , 14, 16, 17, 18	
	replace		X				14	
	repair		X				14	Replace Sub Assembly only.
				X			14	
	overhaul				X		14	
AMPLIFIER, AUDIO FREQUENCY	test		X				5, 11, 13, 14	Continuity, Voltage and Resistance.
	replace		X				14	
	repair			X			14	
HANDSET TS-9-F	replace		X					See separate MAC
RINGING OSCILLATOR Y-101	test		X				5, 11, 13, 14	Continuity, Voltage and Resistance.
	replace		X				14	
	repair			X			14	
TEST SET TS-760/TCC-7	service	X						
	adjust	X						Operating Adjustments.
			X				14	Line up procedures
				X			3, 4, 6, 14, 18	All Adjustments.
	test	X						Operating Adjustments, using built-in facilities.
			X				5, 11, 13, 14	Test frequency levels and tubes using build-in facilities.
				X			1, 3, 4-6, 14, 17, 18	Gain measurements and output levels.
				X			1, 3, 4, 6 thru 10	All tests.
							13 , 14, 16, 17, 18	
	replace		X				14	
	repair		X				14	Replace sub-assembly only.
				X			14	
	calibrate				X		1, 2, 7, 9, 10, 14, 18	OSC CKT
	overhaul			X			14	

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PART OR COMPONENT	MAINTENANCE FUNCTION	ECHELON 1	2	3	4	5	TOOLS REQUIRED	REMARKS
AN/TCC-7; AN/TCC-50 (continued)								
TEST SET SUB-ASSEMBLY	test		X				5, 11, 13, 14	Voltage, continuity, and Resistance.
	replace		X				14	
	repair			X			14	
TELEPHONE CARRIER FREQUENCY TA-228/TCC-7	service	X						
	adjust	X						Operating adjustments using built-in facilities.
			X				14	Line up procedures.
				X			3, 4, 6, 14, 18	All Adjustments.
	inspect	X						Exterior.
			X				14	
	test	X						Operating tests, using built-in facilities.
			X				5, 11, 13, 14	Test signal level, Carrier and Test Frequency levels. Using build-in facilities. Test Electron Tubes.
				X			1, 3, 4, 6, 14, 17, 18	Test output level of Carrier frequency Supplies and Oscillators. Make Gain Measurements. Tube Socket Voltage.
					X		1, 3, 4, 6 thru 10 13 , 14, 16, 17, 18	All testing.
	replace		X				14	
	repair			X			14	
	calibrate				X		1, 2, 7, 9, 10, 14, 18	Oscillator Circuits.
	overhaul			X			14	

SECTION III. ALLOCATION OF TOOLS FOR MAINTENANCE FUNCTIONS
(AN/TCC-7, AN/TCC-50)

TOOLS REQUIRED FOR MAINTENANCE FUNCTIONS	ECHELON 1	2	3	4	5	TOOL CODE	REMARKS
AN/TCC-7; AN/TCC-50 (continued)							
ATTENUATOR TS-402/U			†	†	†	1	
FREQUENCY METER AN/TSM-16				†	†	2	
GENERATOR, SIGNAL SG-71/FCC			†	†	†	3	2 required at the 4th and 5th Echelons.
METER, AUDIO LEVEL ME-71/FCC			†	†	†	4	
MULTIMETER AN/URM-105		†				5	
MULTIMETER TS-352/U			†	†	†	6	
MULTIMETER, METER ME-26/U			†	†	†	7	
OSCILLOSCOPE OS-8/U				†	†	8	
POWER SUPPLY PP-827/U				†	†	9	Required for Trouble-shooting and Testing Individual Components when Terminal Power Supply is not available.
TEST FACILITIES KIT, TELEPHONE CARRIER MK-155/TCC				†	†	10	
TEST SET TS-190/U		†	†	†	†	11	
TEST SET, ELECTRON TUBE; TV-2/U					†	12	Replaces Item No. 13 for 5th Echelon use only.
TEST SET, ELECTRON TUBE, TV-7/U		†	†	†		13	
TOOL EQUIPMENT TE-123		†	†	†	†	14	
TRANSFORMER VARIABLE CN-16/U				†	†	15	
TRANSMISSION MEASURING SET TS-559/FT				†	†	16	
TUBE SOCKET ADDAPTER KIT MX-1258/U			†	†	†	17	
VOLTMETER, METER ME-30/U			†	†	†	18	

SECTION IV. MAINTENANCE ALLOCATION CHART (PP-826/U, PP-826/U)

PART OR COMPONENT	MAINTENANCE FUNCTION	ECHELON 1	2	3	4	5	TOOLS REQUIRED	REMARKS
POWER SUPPLY PP-826/U; PP-826A/U								
	service	X						Exterior
			X				14	
	adjust	X						600v adjustments only
			X				14	All adjustments.
	inspect	X						Exterior.
			X				14	
	test	X						Load current DC output using built-in facilities.
			X				5, 13	Resistance, voltage and continuity
				X			5, 13, 14	All tests use tool code 12 in place of 13 for fifth Echelon
	repair			X			14	
	overhaul				X		14	

SECTION V. ALLOCATION OF TOOLS FOR MAINTENANCE FUNCTIONS (PP-826/U, PP-826A/U)

TOOLS REQUIRED FOR MAINTENANCE FUNCTIONS	ECHELON 1	2	3	4	5	TOOL CODE	REMARKS
PP-826/U; PP-826A/U (continued)							
ATTENUATOR TS-402/U			†	†	†	1	
FREQUENCY METER AN/TSM-16				†	†	2	
GENERATOR, SIGNAL SG-71/FCC			†	†	†	3	
METER, AUDIO LEVEL ME-71/FCC			†	†	†	4	
MULTIMETER AN/URM-105		†				5	
MULTIMETER TS-352/U			†	†	†	6	
MULTIMETER, METER ME-26/U			†	†	†	7	
OSCILLOSCOPE OS-6/U				†	†	8	
POWER SUPPLY PP-827/U				†	†	9	
TEST FACILITIES KIT, TELEPHONE CARRIER MK-155/TCC				†	†	10	
TEST SET TS-190/U		†	†	†	†	11	
TEST SET, ELECTRON TUBE; TV-2/U					†	12	
TEST SET, ELECTRON TUBE, TV-7/U		†	†	†		13	
TOOL EQUIPMENT TE-123		†	†	†	†	14	
TRANSFORMER VARIABLE CN-16/U				†	†	15	
TRANSMISSION MEASURING SET TS-559/FT				†	†	16	
TUBE SOCKET ADDAPTER KIT MX-1258/U			†	†	†	17	
VOLTMETER, METER ME-30/U			†	†	†	18	

SECTION VI. MAINTENANCE ALLOCATION CHART (PP-827/U)

PART OR COMPONENT	MAINTENANCE FUNCTION	ECHELON 1	2	3	4	5	TOOLS REQUIRED	REMARKS
POWER SUPPLY PP-827/U								
	service	X						Exterior
			X				14	
	adjust	X						200v adjustment only
			X				14	All Adjustments.
	inspect	X						Exterior
			X				14	
	test	X						200v output by using built-in facilities
			X				5, 13	Resistance, voltage and continuity
				X			5, 13, 14	All test use tool code 12 in place of 13 for fifth Ech
	repair			X			14	
	overhaul				X		14	

SECTION VII. ALLOCATION OF TOOLS FOR MAINTENANCE FUNCTIONS (PP-827/U)

TOOLS REQUIRED FOR MAINTENANCE FUNCTIONS	ECHELON 1	2	3	4	5	TOOL CODE	REMARKS
PP-827/U (continued)							
ATTENUATOR TS-402/U			†	†	†	1	
FREQUENCY METER AN/TSM-16				†	†	2	
GENERATOR, SIGNAL SG-71/FCC			†	†	†	3	
METER, AUDIO LEVEL ME-71/FCC			†	†	†	4	
MULTIMETER AN/URM-105		†				5	
MULTIMETER TS-352/U			†	†	†	6	
MULTIMETER, METER ME-26/U			†	†	†	7	
OSCILLOSCOPE OS-8/U				†	†	8	
POWER SUPPLY PP-827/U				†	†	9	
TEST FACILITIES KIT, TELEPHONE CARRIER MK-155/TCC				†	†	10	
TEST SET TS-190/U		†	†	†	†	11	
TEST SET, ELECTRON TUBE; TV-2/U					†	12	
TEST SET, ELECTRON TUBE, TV-7/U		†	†	†		13	
TOOL EQUIPMENT TE-123		†	†	†	†	14	
TRANSFORMER VARIABLE CN-16/U				†	†	15	
TRANSMISSION MEASURING SET TS-559/FT				†	†	16	
TUBE SOCKET ADAPTER KIT MX-1258/U			†	†	†	17	
VOLTMETER, METER ME-30/U			†	†	†	18	

SECTION VIII. MAINTENANCE ALLOCATION CHART (TA-219/U)

PART OR COMPONENT	MAINTENANCE FUNCTION	ECHELON 1	2	3	4	5	TOOLS REQUIRED	REMARKS
MODEM, TELEPHONE TA-219/U	service	X						
	adjust	X						Receiving gain
			X				14	System line up using built-in facilities
				X			3, 4, 5, 6	All Adjustments
	inspect		X				14	
	test		X				5, 6, 11, 13	Preliminary tests using built-in facilities
				X			3, 4	Gain measurements
					X		1, 2, 3, 4, 6 thru 11, 13 -18	All tests (use tool code 6 in place of 5 in fifth Ech)
	repair		X				14	Replace sub-assemblies
	repair			X			14	
	overhaul				X		14	

SECTION IX. ALLOCATION OF TOOLS FOR MAINTENANCE FUNCTIONS (TA-219/U)

TOOLS REQUIRED FOR MAINTENANCE FUNCTIONS	ECHELON 1	2	3	4	5	TOOL CODE	REMARKS
TA-219/U (continued)							
ATTENUATOR TS-402/U			†	†	†	1	
FREQUENCY METER AN/TSM-16				†	†	2	
GENERATOR, SIGNAL SG-71/FCC			†	†	†	3	
METER, AUDIO LEVEL ME-71/FCC			†	†	†	4	
MULTIMETER AN/URM-105		†				5	
MULTIMETER TS-352/U			†	†	†	6	
MULTIMETER, METER ME-26/U			†	†	†	7	
OSCILLOSCOPE OS-8/U				†	†	8	
POWER SUPPLY PP-827/U				†	†	9	
TEST FACILITIES KIT, TELEPHONE CARRIER MK-155/TCC				†	†	10	
TEST SET TS-190/U		†	†	†	†	11	
TEST SET, ELECTRON TUBE; TV-2/U					†	12	
TEST SET, ELECTRON TUBE, TV-7/U		†	†	†		13	
TOOL EQUIPMENT TE-123		†	†	†	†	14	
TRANSFORMER VARIABLE CN-16/U				†	†	15	
TRANSMISSION MEASURING SET TS-559/FT				†	†	16	
TUBE SOCKET ADAPTER KIT MX-1258/U			†	†	†	17	
VOLTMETER, METER ME-30/U			†	†	†	18	

By Order of the Secretaries of the Army and the Air Force:

G. H. DECKER,
General, United States Army,
Chief of Staff.

Official:

J. C. LAMBERT,
M*ajor General, United* States Army,
The Adjutant General.

CURTIS E. LeMAY,
Chief of Staff, United States Air Force.

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USA Abn Elct & SPWAR Bd (1)
USAATBD (1)
ARADCOM (2)
ARADCOM Rgn (2)
OS Maj Comd (3)
OS Base Comd (2)
LOG Comd (2)
MDW (1)
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Instl (2)
Ft Monmouth (63)
USATC AD (2)
USATC Eng (2)
USATC Inf (2)
USATC FA (2)
USATC Armor (2)
USAOMC (2)
Svc Colleges (2)
Br Svc Sch (2)
Gen Dep (2) except
Atlanta (none)
Sig Sec. Gen Dep (5)
Sig Dep (12) except
Sacramento Sig Pep (17)
USA Trans Tml Comd (1)
Army Tml (1)
POE (1)
OSA (1)
WRAMC (1)
USAEPG (2)
AFIP (1)
AMS (1)
Army Pictorial Cen (2)
EMC (1)
Yuma Test Sta (2)
USA Strat Comm Comd (4)
USASSA (25)
USASSAMRO (1)
USARCARIB Sig Agcy (1)
USA Sig Msl Spt Agcy (13)
Sig Fld Maint Shops (3)
Def Log Svc Cen (1)
USA Corps (3)
JBUSMC (2)

Units org under fol TOE:
(2 copies each except as indicated)

7	11-155
11-5	11-157
11-6	11-500 (AA-AE) (4)
11-15	11-557
11-18	11-587
11 -36	11-592
11-38	11-597
11-55	17
11-56	32-51
11-95	32-56
11-97	32-78
11 -98	37
1-117	

NG: State AG (3); units-Same as Active Army except allowance is one copy to each unit.

USAR: None.

For explanation of abbreviation used, see AR 320-50.

***TM 11-2139-20/TO 31E1-2TCC7-54**

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TECHNICAL MANUAL
NO. 11-2139-20
TECHNICAL ORDER
NO. 31E1-2TCC7-54

DEPARTMENTS THE ARMY
AND THE AIR FORCE
WASHINGTON 25, D. C., 1 April
1958

TELEPHONE TERMINAL AN/TCC-7

*This manual, together with TM 11-2139-10, 11 March 1858 and TM 11-2139-35 when published, supersedes TM 11-2139, 1 November 1953, including C 1. 29 December 1953 C 2, 2 March 1954 C 3, 19 September 1955 C 4, 11 May 1956 and C 5, 21 November 1957.

CHAPTER 1 INTRODUCTION

1. Scope

a. These instructions are published for the use of personnel responsible for organizational (second echelon) maintenance of Telephone Terminal AN/TCC-7. Complete technical instruction for this equipment includes-

TM 11-2139-10, Telephone Terminal AN/ TCC-7, Operator's Manual.

TM 11-2139-35, Telephone Terminal AN/ TCC-7, Field and Depot Maintenance.

b. Two appendixes are included in this manual-

Appendix I, References.

Appendix II, Maintenance Allocation Charts.

c. Official nomenclature followed by (*) is used to indicate all models of the equipment covered in this manual Thus, Power Supply PP-826(*)/U represents Power Supply PP- 826/U and Power Supply PP-826A/U.

d. Forward all comments on this publication direct to the Commanding Officer, United States Army Signal Publications Agency, Fort Monmouth, N. J.

2. Forms and Records

a. Unsatisfactory Equipment Report.

(1) Fill out and forward DA Form 468 (Unsatisfactory Equipment Report) to Commanding Officer, United States Army Signal Equipment Supply port Agency, Fort Monmouth, N. J., as prescribed in AR 700-38.

(2) Fill out and forward AFTO Form 29 (Unsatisfactory Report) to Commander, Air Material Command, Wright-Patterson Air Force Base, Ohio, as prescribed in AF TO 00-35D-54.

b. Damaged or Improper Shipment. Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment) as prescribed in AR 700-58 (Army); Navy Shipping Guide, Article 1850 4 (Navy); and AFR 71 -4 (Air Force).

c. Preventive Maintenance Form (figs. 1 and 2). Prepare DA Form 11-238 (Maintenance Checklist for Signal Equipment - Sound Equipment, Radio, Direction Finding, Radar, Carrier, Radiosonde and Television) in accordance with the instructions on the form.

3. Internal Differences in Models

Power Supply PP-826/U and Power SUPPLY PP-826A/U are similar in purpose and appearance and may be used interchangeably. However, the protective circuit features differ as follows:

a. Power Supply *PP-826/U.* When the alternating-current (ac) input voltage is too low, the direct-current (dc) output voltage is periodically interrupted and restored. When the dc output voltage falls below the proper value, dc power output is discontinued.

b. Power Supply *PP-826A/U.* When the dc output voltage falls below the proper value, the LOAD ALARM lamp lights and the ac buzzer sounds, de power output is not discontinued.

CHAPTER 2
MAINTENANCE INSTRUCTIONS

Section I. PREVENTIVE MAINTENANCE

4. Scope of Organizational Maintenance

a. Following is a list of maintenance duties normally performed by organizational maintenance personnel. These duties are limited by the available spare parts, tools, materials, and test equipment.

b. Organizational maintenance for Telephone Terminal AN/TCC-7 consists of the following:

(1) Preventive maintenance (par. 6).
(2) Visual inspection (par. 8).
(3) Performance of systematic equipment performance check (TM 11-2139-10).
(4) Troubleshooting (par. 9).
(5) Checking cable continuity (par. 10).
(6) Checking of vacuum tube element and circuit voltages (par. 11).
(7) Testing and replacement of defective vacuum tubes (par. 12).
(8) Replacement of defective lamps, fuses, and lightning arresters (TM 11-213910).
(9) Replacement of assemblies (pars. 13 and 14).

5. Tools, Materials, and Test Equipment

The tools, materials, and test equipment required for organizational maintenance are listed below .

a. *Tools*.

(1) The following special tools and cables are supplied with Telephone Terminal AN/TCC-7.
Hexagonal wrench, 1/8 inch (located on rear of GROUP PANEL).
Hexagonal wrench, 1/16 inch (located on rear of GROUP PANEL).
Seven-pin tube-pin straightener (mounted on SUBGROUP PANEL chassis).
Nine-pin tube-pin straightener (mounted on SUBGROUP PANEL chassis).
Measure cord adapter (located in storage drawer).
Extension cable, 21-conductor (located in storage drawer).
Extension cable, seven-conductor (located in storage drawer).
(2) Tools necessary for organizational maintenance are contained in Tool Equipment TE-123.

b. *Materials*.

(1) Cleaning Compound (Federal stock No. 7930-395-9542).
(2) Lint-free cloth.
(3) Fine sandpaper.

Warning: Prolonged breathing of cleaning compound fumes is dangerous. Make certain that adequate ventilation is provided. Cleaning Compound is flammable, do not use near a flame.

c. Test Equipment.

(1) Multimeter ME-77/U, or equal.
(2) Electron Tube Test Set TV-7/U, or equal (TM 1 1-5083).
(3) Tube Socket Adapter Kit MX-1258/U..

6. Preventive Maintenance

a. DA Form 11-238. This form (figs. 1 and 2) is a preventive maintenance checklist-to be used by organizational maintenance personnel. Items not applicable to the equipment are lined out. References in the ITEM block in the figures are to paragraphs which contain additional maintenance information pertinent to the particular item. Instructions for the use of the form appear on the form. Additional preventive maintenance information concerning items 1 through 7, 9, 10, and 11 on Form 11-238 will be found in the preventive maintenance portion of TM 11-213910.

b. *Items*. The following information is supplementary to Form 11-238. The item numbers correspond to the ITEM numbers on the form.

Items	Maintenance procedures
6	Inspect drawer slide assemblies and cable connector retaining screws for proper operation.
15	Inspect REF VOLT REG tube V9 on the 200 VOLT POWER SUPPLY and tubes VOLT REG V1, V3, and V4 and VOLT STD V2 and V5 on the low-voltage rectifier and alarm unit of the 600 VOLT POWER SUPPLY for a steady purple glow. If a tube appears defective, replace it (par. 12).
27	Perform a systematic equipment performance check (TM 11-2139-10).

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
26.	
27. CHECK FOR NORMAL OPERATION. PAR 6b	✓
28.	

IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING THE INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION.

REPEATER SWITCH ON 600 VOLT POWER SUPPLY NEEDS REPLACEMENT. REPORTED TO 3D ECHELON MAINTENANCE FOR REPAIR.

.

MAINTENANCE CHECK LIST FOR SIGNAL EQUIPMENT

SOUND EQUIPMENT, RADIO, DIRECTION FINDING
RADAR, CARRIER, RADIOSONDE AND TELEVISION
(AR 750-625)

EQUIPMENT NOMEMCLATURE

TELEPHONE TERMINAL AN/TCC-7

EQUIPMENT SERIAL NUMBER

495

INSTRUCTIONS

This form may be used for a period of one month by using the correct dates and weeks of the month. It is to be used as a Preventive Maintenance check list for Signal equipment in actual use, or for a check on equipment prior to issue.

1. For detailed Preventive Maintenance instructions see:
   a. The Technical Manual (in TM 11 series) for the equipment (See DA Pamphlet Number 310-4)
   b. The Supply Bulletin (SB 11-100 series) for the equipment. (See DA Pamphlet Number 310-4)
   c. The Department of the Army Lubrication order. (See DA Pamphlet Number 310-4)

2. The following action will be taken by either the Communications Officer / Chief for 1st echelon, or the Inspector for higher echelon:
   a. Enter Equipment Nomenclature and Serial Number.
   b. Strike out items that do not apply to the equipment.

3. Operator/Inspector will enter in the columns entitled CONDITION, on the proper line, a notation regarding the condition, using symbols specified under LEGEND.

4. After operator completes each daily inspection he will initial over the appropriate dates under “Daily Condition for Month”, then return form to supervisor.

TYPE OF INSPECTION

OPER-ATOR	2/3 ECH-ELON	DATE	SIGNATURE
	✓	*31 OCTOBER 1957*	*W.E. CORWIN*

DA 1 MAY 57 FORM 11-238

REPLACES DA FORMS 11-238, 1 NOV 55; 11-239, 11-244, 11-248, 11-249, 11-280, AND 11-281; WHICH ARE OBSOLETE.

Figure 1. DA Form 11-328, pages 1 and 4.

LEGEND for marking conditions;
Satisfactory, ✓
Adjustment , Repair or Replacement required, X.
Defect corrected; (X)

DAILY CONDITION FOR MONTH OF *OCTOBER, 1957*

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	2D 3D ECH-ELON
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
																✓
																✓
																X
																✓

NO.	DAILY ITEM
1.	COMPLETENESS AND GENERAL CONDITION OF EQUIPMENT. (Carrying cases, wire, cables, tubes, spare parts, technic al manuals).
2.	CLEAN DIRT AND MOISTURE FROM KEYS, JACKS, PLUGS COMPONENT PANELS.
3.	INSPECT CONTROLS FOR NORMAL OPERATION. TAP CONTROLS LIGHTLY FOR EVIDENCE OF CUT-OUT FROM LOOSE CONTACTS.
4.	CHECK FOR NORMAL OPERATION OF EQUIPMENT, BE ALERT FOR UNUSUAL OPERATION OR CONDITION.

WEEKLY	CONDITION EACH WEEK					2D 3D ECH
	1st	2D	3D	4th	5th	
5. CLEAN AND TIGHTEN EXTERIORS OF CASES, RACKS, MOUNTS						✓
6. INSPECT CASES, MOUNTS, AND EXPOSED METAL SURFACES FOR RUST, CORROSION. PAR. 6b						✓
7. INSPECT CORDS, CABLE, WIRE, SHOCK MOUNTS FOR CUTS, KINKS, BREAKS, FRAYING, UNDUE STRAIN.						✓
8.						
9. INSPECT CANVAS ITEMS FOR MILDEW, TEARS, FRAYING.						✓
10. INSPECT ACCESSIBLE ITEMS FOR LOOSENESS; SWITCHES, KNOBS, JAKCS, CONNECTORS, TRANSFORMERS, PILOT LIGHTS, BLOWERS, ETC.						✓
11. CLEAN AND/OR INSPECT BRASS NAME PLATES,DIAL AND METER WINDOWS.						✓
12.						

ADDITIONAL ITEMS FOR 2D AND 3D METER WINDOWS.	CONDITIONS
13. INSPECT SHELTERS AND COVERS FOR ADEQUACY OF WEATHER-PROOFING, TEARS, FRAYING.	✓
14.	

ADDITIONAL ITEMS FOR 2D AND 3D METER WINDOWS.	CONDITIONS
15. INSPECT SEATING OF READILY ACCESSIBLE PLUCKOUT ITEMS; TUBES, LAMPS, FUSES, CONNECTORS. PAR. 6b	(X)
16.	
17.	
18. INSPECT RESISTORS, BUSHINGS AND INSULATORS FOR CRACKS, CHIPPING, BLISTERING, MOISTURE, DISCO LORATION.	✓
19. CLEAN AND TIGHTEN SWITCHES, TERMINAL BLOCKS, BLOWERS, AND ITERIOR OF CHASIS AND CABINETS NOT READILY ACCESSIBLE.	✓
20. INSPECT TERMINAL BLOCKS FOR LOOSE CONNECTIONS, CRACKS AND BREAKS.	✓
21. INSPECT TERMINAL OF LARGE FIXED CAPACITORS AND RESISTORS FOR DIRT, CORROSION, LOOSE CONTACTS.	✓
22. INSPECT TRANSFORMERS, CHOKES, POTENTIOMETERS AND RHEOSTATS FOR OVERHEATING	
23.	
24.	
25. INSPECT WATERPROOF GASKETS FOR LEAKS, WORN OR LOOSE PARTS.	✓

CONTINUED ON PAGE 4

2 **3**

GPO: 1957 O-427034

Figure 2. DA Form 11-328, pages 2 and 3.

Section II. TROUBLE SHOOTING

7. General

a. This section aids in determining which of the components of the AN/TCC-7 terminal is at fault and in localizing the fault in that component to a panel, assembly, or part. Troubleshooting is based on the performance of the-equipment at the time of failure and the use of the senses in determining such troubles as burned-out fuses, loose wiring, etc.

b. The definitions of terms used in referring to all or any part of this equipment are given below :

(1) *Equipment*. Telephone Terminal AN/TCC-7.

(2) *Component*. An integral nomenclature part of the AN/TCC-7.

(3) *PANEL*. A section of a component; may or may not have its own nomenclature.

(4) *Assembly*. Unitized section of a component or PANEL; for example, plug-in assembly.

(5) *Stage*. Associated group of parts which perform a circuit function.

(6) *Part*. Tube, fuse, capacitor, resistor, etc.

8. Visual Inspection

a. When the equipment fails to perform properly, inspect it for obvious faults:

(1) Improper settings of controls or switches (TM 1 1-2139-10).

(2) Worn, broken, or disconnected cables, handset cords, or connectors.

(3) Defective lightning arresters.

(4) Defective fuses.

(5)Faulty ground connections.

(6) Improperly seated pluck-out parts or assemblies.

(7) Low current output from 600 VOLT POWER SUPPLY (normally 100 milliamperes (ma).

(8) Loose or faulty soldered connections.

(9) Loose or faulty binding post connections. **Caution**: If trouble is indicated by the visual inspection, obtain permission from the control terminal to turn off the power before performing the necessary corrective action. Do not perform any corrective action with the power on.

b. After the visual checks have been completed, proceed to the troubleshooting checklist (par. 9).

9. Troubleshooting checklist

The following chart is furnished to help localize trouble in the AN/TCC-7 terminal to a panel, assembly, or part. Only those corrective measures which organizational maintenance personnel can accomplish are given. If the corrective measure given does not restore normal equipment performance, troubleshooting is required at the field maintenance level. Note on the repair tag what corrective measures were taken.

a. *General*. Before using the troubleshooting checklist, examine the operator's repair tag to determine whether the trouble has been sectionalized. If the trouble has not been sectionalized, perform the procedures outlined in the equipment performance checklist and troubleshooting checklist of TM 11-2139-10 before performing any of the corrective measures given in b below .

b. *Troubleshooting* Checklist. The organizational maintenance troubleshooting checklist is divided into four parts: alarms ((1) below), channel faults and failures ((2) below), frequency faults and failures ((3) below), and power supply faults and failures ((4) below). Each part lists the symptoms which may be observed, test points and normal indications to aid in localizing the trouble, the probable trouble that caused the fault or failure, and the corrective measures to be taken. A chart listing the actions or conditions for making equipment performance measurements is provided in TM 11-2139-10.

(1) *Alarms.*

Symptom (alarm indication)	Test point (jack)	Normal indication	Probable trouble	Corrective Measure
			GROUP PANEL	
LOW ALARM or HIGH ALARM	68 kc at REC AMP 1 OUT	0 ± 1 db .	Defective receiving amplifier AR1.	Replace receiving amplifier AR 1 on GROUP PANEL (par. 13, fig. 5).
	68 kc at REC AMP 2 OUT	0 ± 1 db .	Defective receiving amplifier AR2.	Replace receiving amplifier AR 2. on GROUP PANEL (par. 13, fig. 5).
			Defective regulator and alarm Z6.	Replace regulator and alarm Z6 on GROUP PANEL (par. 13, fig. 5).
			Defective interconnecting cable (LOW ALARM only).	Check cable continuity (par. 10, item 1).
			CARRIER SUPPLY PANEL	
68 KC ALARM	.....	.. ..	Defective alarm amplifier circuit V8.	Check tube socket voltage and resistances of tube V8 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
120 KC ALARM	120 KC.....	0 ± 3 db..	Defective 120-kc amplifier circuit.	Check tube socket voltages and resistances of tube V16 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
			Defective alarm amplifier circuit V8.	Check tube socket voltages and resistances of tube V8 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
68 KC ALARM and 120 KC ALARM (CARR SYNC switch in LOCAL position)	68 KC LOCAL	0 ± 3 db..	Defective 64-kc amplifier circuit V2.	Check tube socket voltages and resistances of tube V2 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
			Defective 64-kc oscillator circuit V1	Check tube socket voltages and resistances of tube V1 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
			Absence of B+ voltage---------	Check +200V voltage from 200 VOLT POWER SUPPLY to CARRIER SUPPLY PANEL (fig. 25).
	DIV 1.....	0 ± 3db...	Defective first frequency divider amplifier circuit V4.	Check tube socket and resistances of tube V4 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
	DIV 2.....	0 ± 3 db..	Defective second frequency divider amplifier circuit V5.	Check tube socket voltages and resistances of tube V5 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
	4KC.....	0 ± 3 db .	Defective 4-kc amplifier circuit V6.	Check tube socket voltages and resistances of tube V6 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
			Defective alarm amplifier circuit V8.	Check tube socket voltages and resistances of tube V8 on CARRIER SUPPLY PANEL (par. 11, fig. 11).

Symptom (alarm indication)	Test point (jack)	Normal indication	Probable trouble	Corrective Measure
			CARRIER SUPPLY PANEL - Continued	
68 KC ALARM and 120 KC ALARM (CARR SYNC switch in REMOTE position).	SYNC.....	0 ± 3 db..	Defective sync amplifier circuit V1.	Check tube socket voltages and resistances of tube V1 on GROUP PANEL (par. 11, fig. 13).
	64 KC REMOTE.....	0 ± 3 db ..	Defective remote 64 kc amplifier circuit V7.	Check tube socket voltages and resistances of tube V7on CARRIER SUPPLY PANEL (par. 11, fig. 11).
			Defective rectifier circuit V3	Check tube socket voltages and resistances of tube V3 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
			Absence of B+ voltage	Check +200V voltage from 200 VOLT POWER SUPPLY to CARRIER SUPPLY PANEL (fig. 25).
	DIV 1.....	0 ± 3 db..	Defective second frequency divider amplifier circuit V4.	Check tube socket voltages and resistances of tube V4 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
	DIV 2.....	0 ± 3 db..	Defective second frequency divider amplifier circuit V5.	Check tube socket voltages and resistances of tube V5 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
	4 KC.....	0 ± 3 db..	Defective 4-kc amplifier circuit V6.	Check tube socket voltages and resistances of tube V6 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
			Defective alarm amplifier circuit V8.	Check tube socket voltages and and resistances of tube V8 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
			600 VOLT POWER SUPPLY	
LOAD ALARM, LOAD ALARM and LOW VOLTAGE, or LOAD ALARM AND HIGH VOLTAGE.	.....	.. ..	Absence of input voltage from 200 VOLT POWER SUPPLY -	Check for 115 or 230 volt ac input at connector J2 or J3 on 200 VOLT POWER SUPPLY (fig. 25).
			Defective rectifier, regulator, or control circuits on main chassis.	Check tube socket voltages or resistances of tubes V1 through V6 on main chassis of 600 VOLT POWER SUPPLY. (par. 11, fig. 21).
			Defective regulation or control circuits on low voltage rectifier and alarm Z1 or Z2.	Check tube socket voltages or resistances of tubes V1 through V6 on low voltage rectifier and alarm Z1 or Z2 (par. 11, fig. 21).
			Defective interconnecting cable.	Check cable continuity (par.10, item 4).

(2) *Channel faults or failures.*

Symptom (fault or failure)	Test point (jack)	Normal indication	Probable trouble	Corrective Measure
All 12-channels (no alarm indication) *transmitting.*	68 kc at TR AMP OUT.	0 db.....	Defective transmitting amplifier AR3.	Replace transmitting amplifier AR3 on GROUP PANEL (par. 13, fig. 5).
	37 kc at TR AMP OUT.	0 db.....	Defective modem on amplifier AR4.	Replace modem and amplifier AR4 on GROUP PANEL (par. 13, fig. 5).
			Defective transmitting amplifier circuit V7.	Check tube socket voltages and resistances of tube V7 on SUBGROUP PANEL (par. 11, fig. 12).
			Defective interconnecting cable.	Check cable continuity (par.10, item 5).
Receiving	83kc at DEM OUT	0 ± 1 db..	Defective modem and amplifier AR4.	Replace modem and amplifier AR4 on GROUP PANEL (par. 13, fig. 5).
			Defective interconnecting cable.	Check cable continuity (par. 10 item 6).
Transmitting and receiving.	.....	.....	Defective interconnecting cable.	Check cable continuity (par.10 item 5).
			Absence of B+ or filament voltage.	Check +200V and 6.3v ac from 200 VOLT POWER SUPPLY to SUBGROUP PANEL (fig. 25).
All channels in CHAN MODEM 1: (no alarm indications).				
Transmitting.....	11 kc at MOD IN 1	0 ± 3 bd	Defective interconnecting cable.	Check cable continuity (par. 10 item 7).
Receiving.....	11 kc at DEM OUT 1	0 ± 3 db	Defective first amplifier circuit V6 or second amplifier circuits V5.	Check tube socket voltages and resistances of tubes V5 and V6 on SUBGROUP PANEL (par. 11, fig. 12).
			Defective interconnecting cable.	Check cable continuity (par. 10 item 8).
Transmitting and receiving.	56 kc.....	0 ± 3 db..	Defective 56 - kc amplifier circuit V13.	Check tube socket voltages and resistances of tube V13 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
			Defective interconnecting cable.	Check cable continuity (par.10 item 7; plug P1 only).
All channels in CHAN MODEM 2: (no alarm indications).				
Transmitting.....	11-kc at MOD IN 2	0 ± 3db...	Defective interconnecting cable.	Check cable continuity (par.10 item 9).
Receiving	11-kc at DEM OUT 2.	0 ± 3 db..	Defective first amplifier circuit V4 or second amplifier circuit V3.	Check tube socket voltages and resistances of tubes V3 and V4 on SUBGROUP PANEL (par. 11 , fig. 1 2).
			Defective interconnecting cable.	Check cable continuity (par. 10 item 10).

Symptom (fault or failure)	Test point (jack)	Normal indication	Probable trouble	Corrective Measure
Transmitting and receiving.	72 kc.....	0 ± 3 db.	Defective 72-kc amplifier circuit V14.	Check tube socket voltages and resistances of tube V14 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
			Defective interconnecting cable.	Check cable continuity (par. 10, item 9; plug P1 only).
All channels in CHAN MODEM 3:(no alarm indications).				
Transmitting	11-kc at MOD IN 3	0 ±3db....	Defective interconnecting cable.	Check cable continuity (par. 10 item 11).
Receiving	11-kc at DEM OUT 3.	0 ±3db....	Defective first amplifier circuit V2 and second amplifier Circuit V1.	Check tube socket voltages and resistances of tubes V1 and V-2 on SUBGROUP PANEL (par. 11, fig. 11).
			Defective interconnecting cable.	Check cable continuity (par. 10, item 12).
Transmitting and receiving	88 kc.....	0 ± 3 db..	Defective 88 kc amplifier circuit V15.	Check tube socket voltages and resistances of tube V15 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
			Defective interconnecting cable.	Check cable continuity (par. 10, item 11; plug P1 only).
Channel 1 of CHAN MODEMS 1, 2, and 3; transmitting & receiving.	8 kc.....	± 0 ±3db.	Defective 8-kc amplifier circuit V11.	Check tube socket voltages and resistances of tube V11 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
Channel 2 of CHAN MODEMS 1, 2 and 3; transmitting & receiving.	12 kc.....	0 ± 3 db..	Defective 12-kc amplifier circuit V10.	Check tube socket voltages and resistances of tube V10 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
Channel 3 of CHAN MODEMS 1, 2 and 3; transmitting & receiving.	16 kc.....	0 ± 3 db..	Defective 16-kc amplifier circuit 12.	Check tube socket voltages and resistances of tube V12 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
Channel 4 of CHAN MODEMS 1, 2 and 3; transmitting & receiving.	20 kc.....	0 ± 3 db..	Defective 20-kc amplifier circuit V9.	Check tube socket voltages and resistances of tube V9 on CARRIER SUPPLY PANEL (par. 11, fig. 11).

Symptom (fault or failure)	Test point (jack)	Normal indication	Probable trouble	Corrective Measure
Channe1 of CHAN MODEM 1, 2, or 3.				
Transmitting and receiving.	*1 kc at CHANNEL* OUT and 7 kc at MOD IN 1, MOD IN 2, or MOD IN 3.	*0 db*.....	Defective interconnecting cable.	*Check cable continuity:* (normal indication approximately 22 ohms): Channel 1 of CHAN MODEM 1 (par. 10, item 13). Channel 1 of CHAN MODEM 2 (par. 10, item 14). Channel 1 of CHAN MODEM 3 (par. 10, item 15).
			Defective CHAN 1 assembly	Replace CHAN 1 assembly (par. 14, fig. 6).
Receiving	1 kc at CHANNEL OUT.	0 ±.5 db	Defective CHAN 1 assembly	Replace CHAN 1 assembly (par. 14, fig. 6).
Channel 2 of CHAN MODEM 1, 2, or 3.				
Transmitting and receiving.	1 kc at CHANNEL OUT and 11 kc at MOD IN l, MOD IN 2, or MOD IN 3.	0 db.....	Defective interconnecting cable.	Check cable continuity (normal indication approximately 22 ohms): Channel 2 of CHAN MODEM 1 (par. 10, item 16). Channel 2 of CHAN MODEM 2 (par. 10, item 17). Channel 2 of CHAN MODEM 3 (par. 10, item 18).
			Defective CHAN 2 assembly	Replace CHAN 2 assembly (par. 14, fig. 6).
Receiving only.....	1 kc at CHANNEL OUT.	0 ±.5 db...	Defective CHAN 2 assembly	Replace CHAN 2 assembly (par 14, fig. 6).
Channel 3 of CHAN MODEM 1, 2, or 3.				
Transmitting and - receiving.	1 kc at CHANNEL OUT and 15 kc at MOD) IN 1, MOD IN 2, or MOD IN 3.	0 db.....	Defective interconnecting cable-.	Check cable continuity (normal indication approximately (22 ohms): Channel 3 of CHAN MODEM 1 (par. 10, item 19). Channel 3 of CHAN MODEM 2 (par. 10, item 20). Channel 3 of CHAN MODEM 3 (par. 10, item 21).
			Defective CHAN 3 assembly	Replace CHAN 3 assembly (par. 14, fig. 6).
Receiving only.....	1 kc at CHANNEL OUT.	0 ±.5 db...	Defective CHAN 3 assembly-	Replace CHAN 3 assembly (par 14, fig. 6).

Symptom (fault or failure)	Test point (jack)	Normal indication	Probable trouble	Corrective Measure
Channel 4 of CHAN MODEM 1, 2, or 3.				
Transmitting and - receiving	1 kc at CHANNEL OUT and 19 kc at MOD IN 1, MOD IN 2, or MOD IN 3 .	0 db.....	Defective interconnecting cable- .	Check cable continuity (normal indication approximately 22 ohms): Channel 4 of CHAN MODEM 1 (par. 10, item 22). Channel 4 of CHAN MODEM 2 (par. 10, item 23). Channel 4 of CHAN MODEM 3 (par. 10, item 24).
			Defective CHAN 4 assembly	Replace CHAN 4 assembly (par. 14, fig. 6).
Receiving only.....	1 kc at CHANNEL OUT.	0 ±5 db.....	Defective CHAN 4 assembly	Replace CHAN 4 assembly (par 14, fig. 6).

(3) *Frequency faults or failures.*

Symptom (fault or failure)	Test point (jack)	Normal indication	Probable trouble	Corrective Measure
Unable to make - frequency measurement on TEST PANEL.	....	.....	Defective flat amplifier AR2.	Replace flat amplifier AR2 on TEST PANEL (par. 13, fig. 3)
			Defective rectifier circuit V3.	Check tube socket voltages and resistances of tube V3 on TEST PANEL (par. 11, fig. 7).
			Absence of B+ and filament voltage.	Check +200V and 6.3v ac voltages from 200 VOLT POWER SUPPLY to TEST PANEL (fig. 25).
Unable to make selective measure- ments on TEST PANEL .	....	.....	Defective if amplifier AR1	Replace IF amplifier AR1 on TEST PANEL (par. 13, fig. 3)
			Defective carrier oscillator circuit V2.	Cheek tube socket voltages and resistances of tube V2 (par. 11, fig. 7).
Hf oscillator output	CHECK HF.....	0 db.....	Hf oscillator circuit V4	Check tube socket voltages and resistances of tube V4 (par. 11, fig. 7).
1-kc oscillator out- put (TEST PANEL). 1-kc output of ORDER WIRE PANEL	CHECK 1 kc.....	0 db.....	Defective 1 kc oscillator circuit V1.	Check tube socket voltages and resistances of tube V1 (par. 11, fig. 3).
Transmitting.....	TR AMP OUT	0 db.....	Defective transmitting amplifier AR101.	Replace transmitting amplifier AR101 on ORDER WIRE PANEL (par. 13, fig.4)
			Defective 1-kc oscillator circuit V1.	Check tube socket voltages and resistances of tube V1 on TEST PANEL (par. 11, fig. 7)
			Defective interconnecting cable.	Check cable continuity (par. 10, item 25).

Symptom (fault or failure)	Test point (jack)	Normal indication	Probable trouble	Corrective Measure
Receiving	REC AMP OUT	-7db+0+4db	Defective receiving amplifier AR102.	Replace receiving amplifier AR102 on ORDER WIRE PANEL (par. 13, fig. 4).
			Defective interconnecting cable.	Check cable continuity (par. 10 item 26).
1-kc output of channel receive circuits.	CHANNEL OUT	0 db.....	Defective CHAN 1, 2,3, or 4 assembly.	Replace CHAN 1, 2, 3, or 4 assembly in CHAN MODEM 1, 2, or 3 (par. 14 fig.6).
			Absence of B+ or filament voltage.	Check +200v and 6.3v ac voltages from 200 VOLT POWER SUPPLY to CAN MODEM 1, 2, or 3 (fig. 25).
			Defective interconnecting cable.	Check cable continuity (par.10, item 27).
1,600 cps output of ORDER WIRE PANEL	TR AMP OUT	Approximately +5 db.	Defective ringer oscillator circuit Y101.	Replace ringer oscillator Y101 on ORDER WIRE PANEL. (par. 13, fig. 4).
			Defective transmitting - amplifier circuit AR101.	Replace transmitting amplifier- AR101 on ORDER WIRE PANEL (par. 13, fig. 4).
			Defective interconnecting cable.	Check cable continuity (par.10 item 28).
4-kc output At DIV 2 jack.	DIV 2.....	0 ±3 db	Defective second frequency divider amplifier circuit V5.	Check tube socket voltages and resistances of tube V5 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
4-kc output at 4 KC jack.	4 KC.....	0 ± 3 db	Defective 4-kc amplifier circuit V6.	Check tube socket voltages and resistances of tube V6 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
7-kc output from channel 1 of CHAN MODEM 1, 2, *or* 3.	MOD IN 1	0 ± 3 db	Defective 8-kc amplifier circuit V11.	Check tube socket voltages and resistances of tube
			Defective interconnecting cable.	V11 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
				Check cable continuity (normal indication approximately 22 ohms): *Channel 1 of CHAN MODEM 1* (par. 10, item 13). *Channel 1 of CHAN MODEM 2* (par. 10, item 14). *Channel 1 of CHAN MODEM 3* (par . 10, item 15).
8-kc output at 8 KC jack.	8 KC.....	0 ± 3 db	Defective 8-kc amplifier circuit V11.	Check tube socket voltages and resistances of tube V11 on CARRIER SUPPLY PANEL (par. 11, fig. 11).

Symptom (fault or failure)	Test point (jack)	Normal indication	Probable trouble	Corrective Measure
11-kc output from Channel 2 of CHAN MODEM 1, 2, *or* 3.	12 KC.....	0 ±3 db.....	Defective 12-kc amplifier circuit V10.	Check cable continuity (normal indication approximately 22 ohms): *Channel 2 of CHAN MODEM 1* (par. 10, item 16). *Channel 2 of CHAN MODEM 2* (par. 10,item 17). *Channel 2 of CHAN MODEM 3* (par. 10, item 18).
11-kc output at DEM OUT 1 jack.	DEM OUT 1.....	0 ±3 db.....	Defective 56 kc amplifier circuit V13.	Check tube socket voltages and resistance of tube V13 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
			Defective 1st or 2d amplifier circuits V5 or V6.	Check tube socket voltages and resistance of tubes V5 and V6 on SUB GROUP PANEL (par. 11, fig. 12).
11-kc output at DEM OUT 2 jack.	DEM OUT 2.....	0 ±3 db.....	Defective 72 kc amplifier circuit V14.	Check tube socket voltages and resistance of tube V15 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
			Defective 1st or 2d amplifier circuits V4 or V3.	Check tube socket voltages and resistances of tubes V3 and V4 on SUB-GROUP PANEL (par. 11, fig. 12).
11-kc output at DEM OUT 3 jack.	DEM OUT 3.....	0 ±3 db.....	Defective 72-kc amplifier V15.	Check tube socket voltages and resistance of tube V15 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
			Defective 1st or 2d amplifier circuits V2 or V1.	Check tube socket voltages and resistances of tubes V1 and V2 on SUB-GROUP PANEL (par. 11, fig. 12).
12-kc output at 12 KC jack.	12 KC.....	0 ± 3 db.....	Defective 12-kc amplifier circuit V10.	Check tube socket voltages and resistances of tube V10 on CARRIER SUPPLY PANEL (par. 11, fig. 11)

Symptom (fault or failure)	Test point (jack)	Normal indication	Probable trouble	Corrective Measure
15-kc output of Channel 3 of CHAN MODEM 1, 2, *or* 3.	16 KC.....	0 ± 3 db	Defective 16 kc oscillator circuit V12.	Check tube socket voltages and resistance of tube V12 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
			Defective interconnecting cable.	Check cable continuity (normal indication approximately 22 ohms): *Channel 3 of CHAN MODEM 1* (par. 10, item 19). *Channel 3 of CHAN MODEM 2* (par. 10, item 20). *Channel 3 of CHAN MODEM 3* (par. 10, item 21).
16-kc output at DIV 1 jack.	DIV 1.....	0 ± 3 db	Defective first frequency divider circuit V4.	Check tube socket voltages and resistances of tube V4 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
16-kc output at 16 KC jack.	16 KC.....	0 ±3 db	Defective 16-kc amplifier circuit V12.	Check tube socket voltages and resistances of tube V12 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
19-kc output of Channel 4 of CHAN MODEM 1, 2, *or* 3.	20 KC.....	0 ± 3 db	Defective 20-kc amplifier circuit V9.	Check tube socket voltages and resistances of tube V9 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
			Defective interconnecting cable.	Check cable continuity (normal indication approximately 22 ohms): *Channel 4 of CHAN MODEM 1* (par. 10, item 22). *Channel 4 of CHAN MODEM 2* (par. 10, item 23). *Channel 4 of CHAN MODEM 3* (par. 10, item 24).
20-kc output at 20 KC jack.	20 KC.....	0 ±3 db.....	Defective 20-kc amplifier circuit V9.	Check tube socket voltages and and resistances of tube V9 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
28-kc output at TR AMP OUT jack.	TR AMP OUT	0 db.....	Defective interconnecting cable.	Check cable continuity (par. 10 item 2).

Symptom (fault or failure)	Test point (jack)	Normal indication	Probable trouble	Corrective Measure
37-kc output of GROUP PANEL	TR AMP OUT	0 ± 3 db	Defective transmitting amplifier AR4.	Replace transmitting amplifier AR4 on GROUP PANEL (par. 13,fig. 5).
	12 KC, 72 KC, or 120 KC	0 ±3 db	Defective 12-kc, 72-kc, or 120-kc amplifier circuit V10, V14, or V16.	Check tube socket voltages and resistances of tubes V10, V14, and V16 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
	83 kc at 60-108 KC	0 ±2 db	Defective transmitting amplifier circuit V7.	Check tube socket voltages and resistances of tube V7 on SUB GROUP PANEL (par. 11, fig. 12).
56-kc output at 56 KC jack.	56 KC	0 ±3 db	Defective 56-kc amplifier circuit V13.	Check tube socket voltages and resistances of tube on CARRIER SUPPLY PANEL (par. 11, fig. 11).
62-kc output at TR AMP OUT jack.	TR AMP OUT	Less than ± 5 db or no indication.	Defective transmitting amplifier circuit AR3.	Replace transmitting amplifier AR3 on GROUP PANEL (par. 13, fig 5).
62-kc output at REC 62 KC jack.	REC 62 KC	Less than -5 db or no indication.	Defective receiving amplifier circuit AR1.	Replace receiving amplifier AR1 on GROUP PANEL (par. 13, fig. 5).
			Defective receiving - amplifier AR2.	Replace receiving amplifier AR2 on GROUP PANEL (par. 13, fig. 5)
64-kc input at 64 KC LOCAL jack.	64 KC LOCAL	0 ± 3 db	Defective 64 kc oscillator or amplifier circuit V1 orV2.	Check tube socket voltages and resistances of tubes V1 and V2 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
64-kc input at 64 KC REMOTE jack	64 KC REMOTE	0 ± 3 db	Defective remote amplifier V7.	64-kc Check tube socket voltages and resistances of tube V7 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
65-kc output at TR AMP OUT jack.	TR AMP OUT	0 db	Defective high frequency oscillator V4.	Check tube socket voltages and and resistances of tube V4 on TEST PANEL (par.11, fig. 7)
			Defective interconnecting cable.	Check cable continuity (par. 10, item 29).
65-kc output at REC AMP 2 OUT jack.	REC AMP 2 OUT.	0 db	Defective high frequency oscillator V4.	Check tube socket voltages and resistances of tube V4 on TEST PANEL (par.11, fig. 7). Check cable continuity (par.10, item 30).
67-kc output of subgroup modulator 1.	60-108 KC	0 ±2 db	Defective 12-kc or 56-kc amplifier circuits V10 or V13.	Check tube socket voltages and resistances of tubes V10 and V13 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
68-kc output at TR AMP OUT jack	TR AMP OUT	0 db	Defective interconnecting cable.	Check cable continuity (par. 10, item 2).
68-kc input at SYNC jack.	SYNC	0 db ±3	Defective SYNC amplifier	Check tube socket voltages V1 and resistances of tube V1 on GROUP PANEL (par. 11, fig. 13).
			Defective interconnecting cable.	Check cable continuity (par. 10, item 3).

Symptom (fault or failure)	Test point (jack)	Normal indication	Probable trouble	Corrective Measure
72-kc output at 72 KC jack.	72 KC	0 ±3 db.....	Defective 72-kc amplifier V14.	Check tube socket voltages and resistances of tube V14 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
83-kc output of subgroup modulator 2.	60-108 KC OUT	0 ±2 db.....	Defective 12-kc or 72-kc amplifier circuit V10 or V14.	Check tube socket voltages and resistances of tubes V10 and V14 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
83-kc fault test	TR AMP OUT	0 db.....	Defective high frequency frequency. circuit V4.	Check tube socket voltages and resistances of tube V4 on TEST PANEL (par.11, fig. 7).
83-kc output at DEM OUT jack.	DEM OUT.....	0 ±1 db	Defective modem and am- amplifier AR4.	Replace modem and amplifier AR4 on GROUP PANEL (par. 13, fig. 5).
			Defective interconnecting cable.	Check cable continuity (par. 10 item 5; plug P2 only).
88-kc output at 88 KC jack.	88 KC.....	0 ±3 db.....	Defective 88-kc amplifier V15.	Check tube socket voltages and resistances of tube V15 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
91-kc fault test frequency.	TR AMP OUT	0 db	Defective high frequency oscillator V4.	Check tube socket voltages and resistances of tube V4 on TEST PANEL (par. 11, fig. 7).
99-kc output of sub-group modulator 3.	60-108 KC.....	0 db ± 2	Defective 12-kc or 88-kc - amplifier circuits V10 or V15.	Check tube socket voltages and resistances of tubes V10 and V10 and V15 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
99-kc fault test - frequency.	TR AMP OUT	0 db	Defective high frequency oscillator V4.	Check tube socket voltages and resistances of tube V4 on TEST PANEL (par. 11, fig. 7).
120-kc output at 120 KC jack.	120 KC.....	0 ±3 db.....	Defective 120-kc amplifier circuit V16.	Check tube socket voltages and resistances of tube V16 on CARRIER SUPPLY PANEL (par. 11, fig. 11).
Unable to make any frequency measurements at TR AMP OUT jack.	TR AMP OUT	0 ±.5 db	Defective transmitting amplifier AR3.	Replace transmitting amplifier AR3 on GROUP PANEL (par. 13, fig. 5).
Unable to make any frequency measurements at REC AMP 1 jack.	REC AMP 1.....	0 ±.5db	Defective receiving amplifier - AR1.	Replace receiving amplifier AR 1 on GROUP PANEL (par. 13 fig. 5).
Unable to make any frequency measurements at REC AMP 2 jack.	REC AMP 2.....	0 ±.5db	Defective receiving amplifier - AR2.	Replace receiving amplifier AR 2 on GROUP PANEL (par (par. 13, fig. 5).

(4) Power supply faults or failures.

Symptom (fault or failure)	Test point (jack)	Normal indication	Probable trouble	Corrective Measure
200 VOLT POWER SUPPLY.	.....	0 db on TEST PANEL meter.	Absence of 115 or 230 volt ac input. Defective rectifier or - regulator circuits V1 through V9.	Check 115 or 230 volt ac input to 200 VOLT POWER SUPPLY (fig. 25). Check tube socket voltages and resistances of tubes V1 through on 200 VOLT POWER SUPPLY (par. 11, fig. 20).
600 VOLT POWER SUPPLY.	.....	100 ma on CURRENT meter.	Absence of 115 or 230 volt ac input. Defective rectifier or regulator circuits V1 through V6. Defective low voltage rectifier and alarm Z1 or Z2.	Check for 115 or 230 volt ac input at connector J2 or J3 on 200 VOLT POWER SUPPLY (fig.25). Check tube socket voltages and resistances of tubes V1 through on main chassis of 600 VOLT POWER SUPPLY (par. 11, fig. 21). Check tube socket voltages and resistances of low voltage rectifier and alarm Z1 or Z2 on 600 VOLT POWER SUPPLY (par. 11, fig.21).

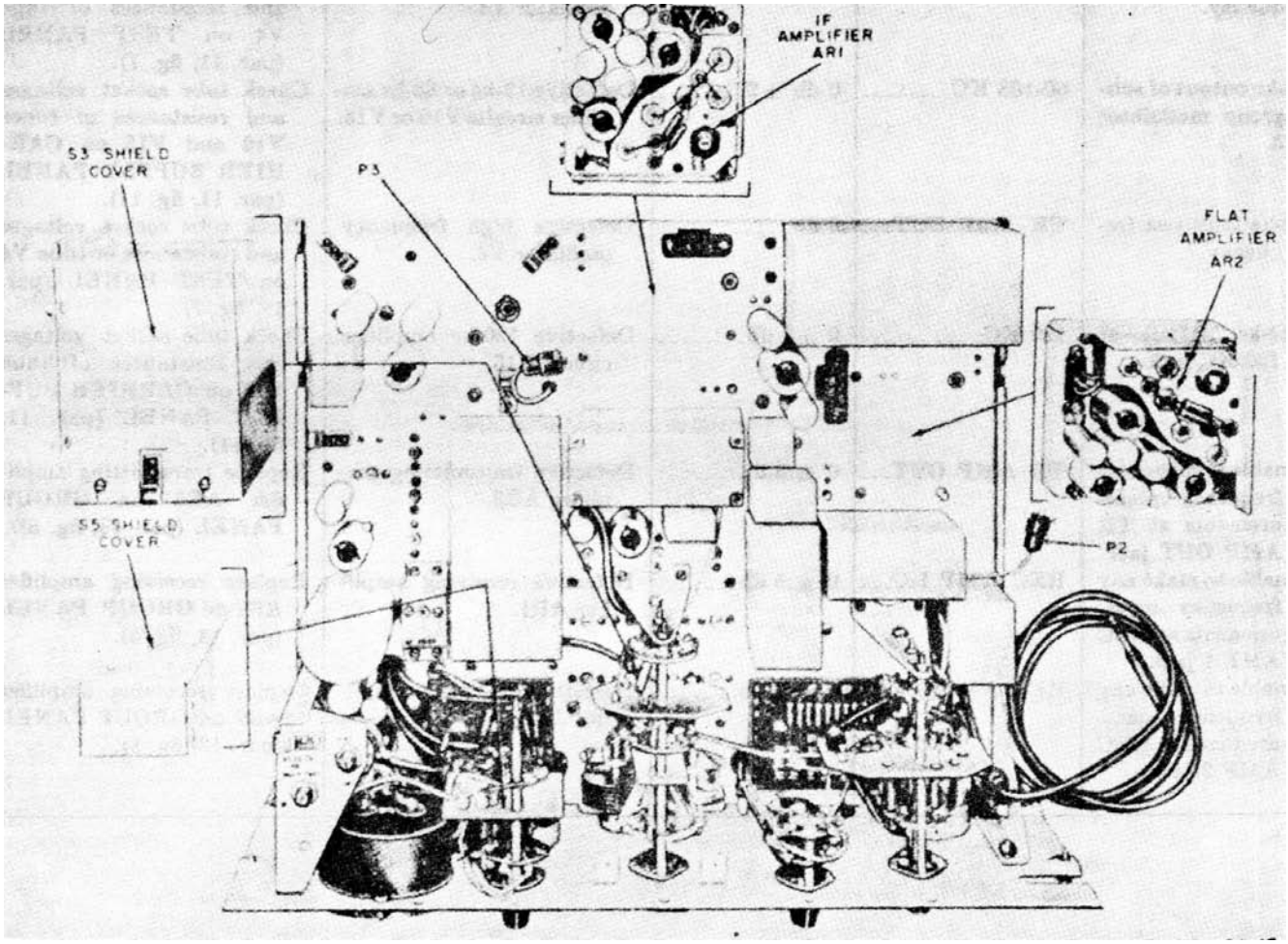


Figure 3. Telephone Test Set TS-760/TCC-7, top view of chassis, location of plug-in assemblies.

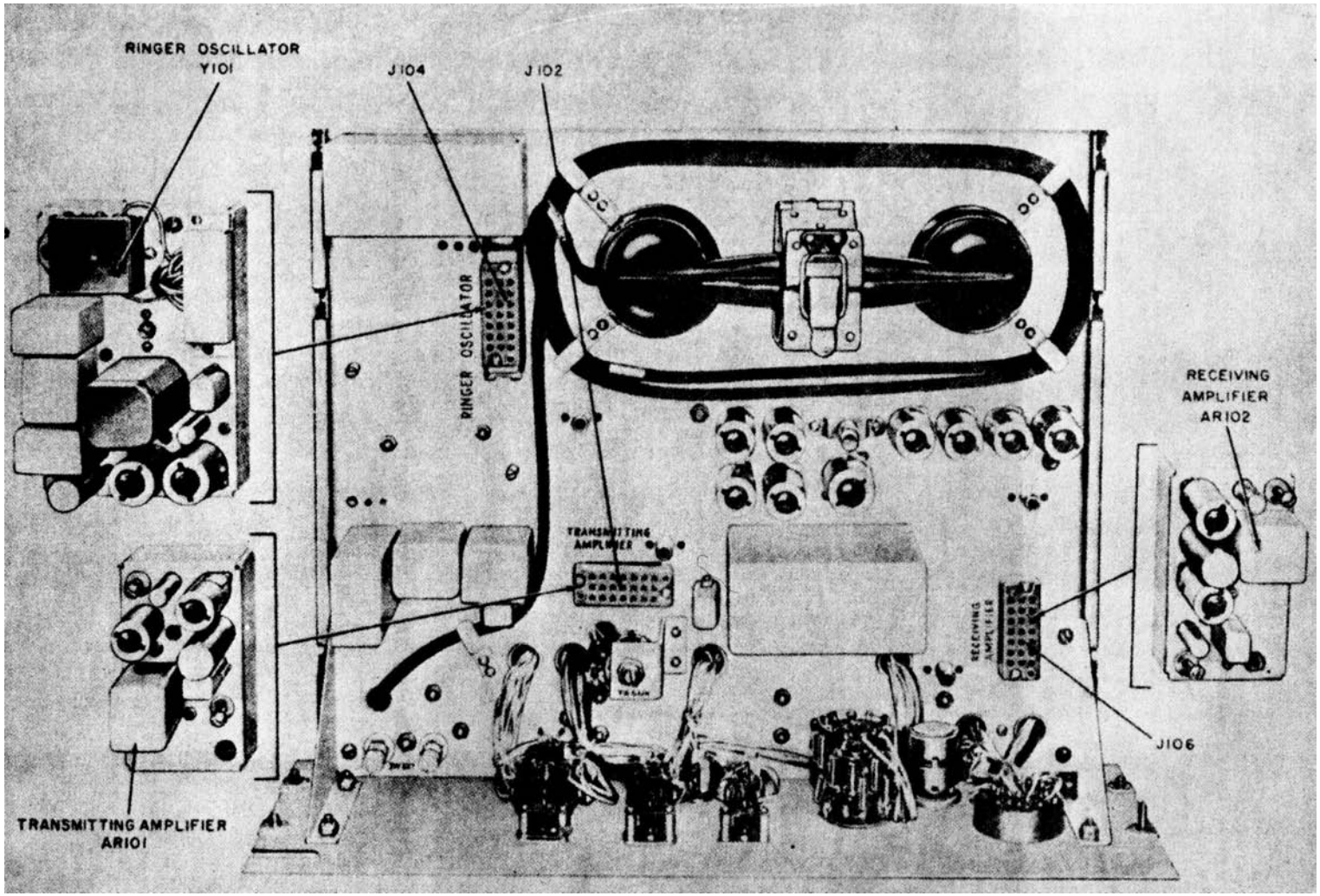


Figure 3. Telephone Test Set TS-760/TCC-7, top view of chassis, location of plug in assemblies.

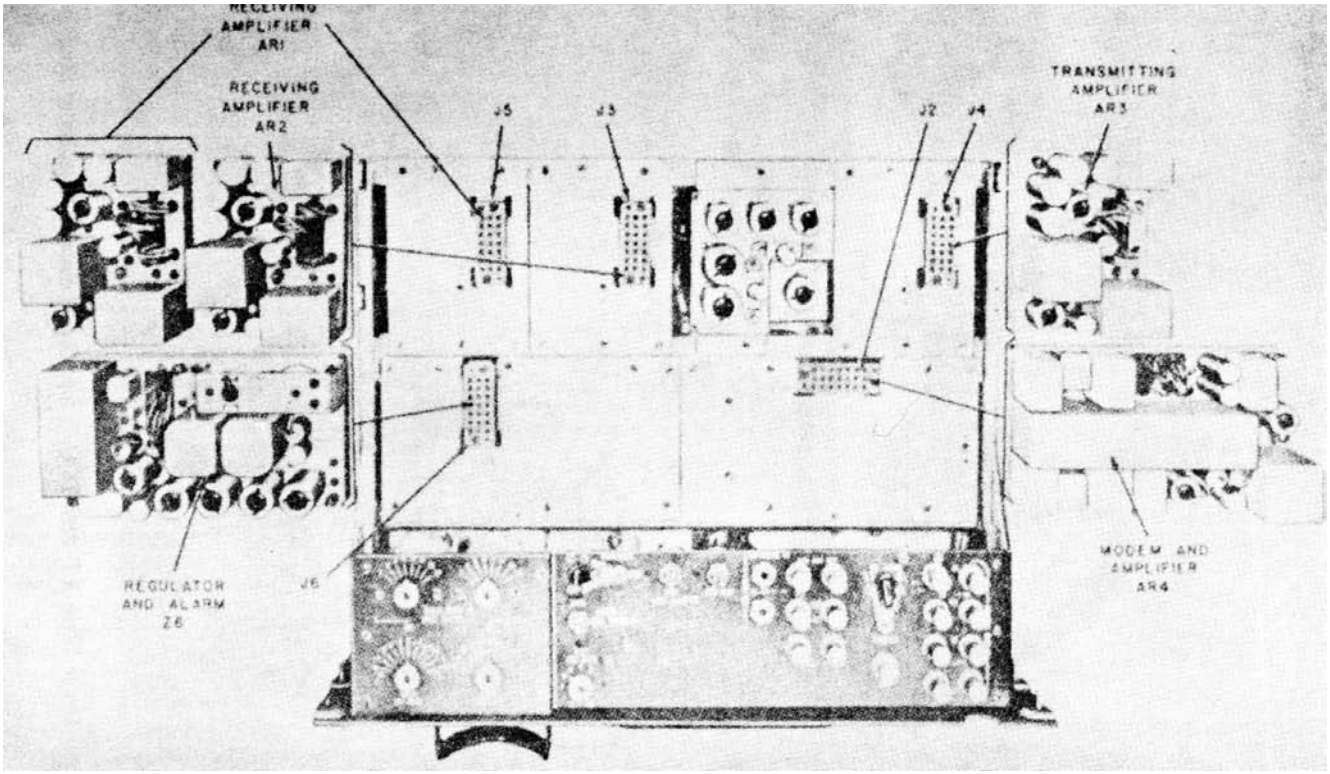


Figure 5. Amplifier-Pilot Regulator AM-707/TCC-7, GROUP PANEL, top view of chassis, location of plug-in assemblies

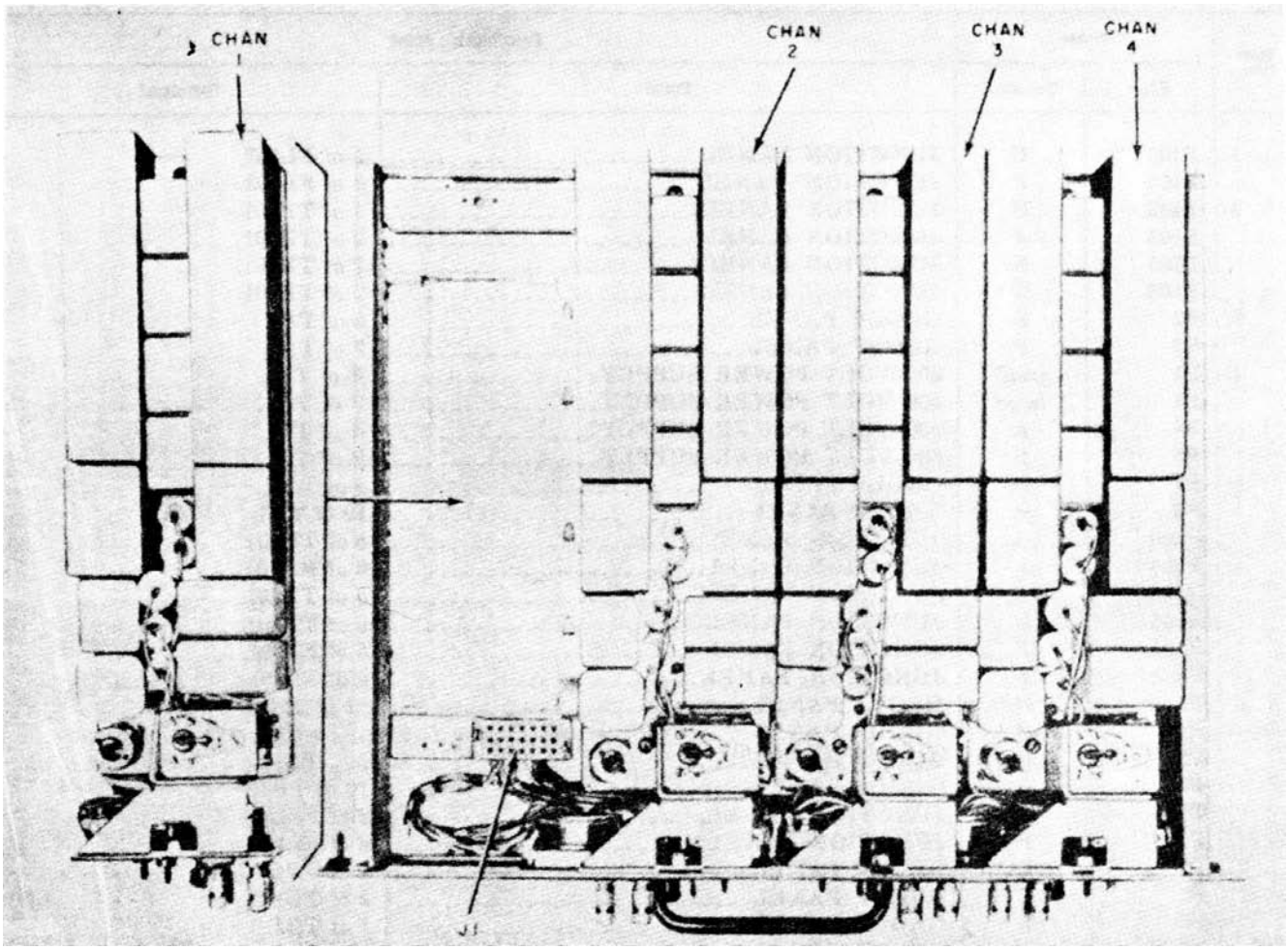


Figure 6. Telephone Modem TA-219/U, top view of chassis, location of channel assemblies.

10. Cable Continuity Chart

The cable continuity chart is used in conjunction with the troubleshooting checklist (par. 9b). Cable continuity checks listed in the *corrective measure* column are referenced to items in the cable continuity chart. Each item in the chart below provides the connecting points which should be checked to determine whether continuity exists through the cable or cables of the circuit in trouble. Figure 25 provides complete interpanel cabling for Telephone Terminal AN/TCC-7.

Warning: Disconnect all power before performing the cable continuity checks. When power to the equipment is disconnected, some capacitors still may retain dangerous voltages. Short-circuit the capacitors to ground. When the trouble has been corrected, replace the equipment in its ease, reconnect the power and the interconnecting cables, and check for satisfactory operation (TM 11-2139-10).

Item No.	Cable		Terminating Point	
	Plug	Terminal	Panel	Terminal
1	P105	C	JUNCTION PANEL	5 of FL102.
	P105	P	JUNCTION PANEL	6 of FL102.
2	P103	H	JUNCTION PANEL	1 of TB101.
	P103	J	JUNCTION PANEL	2 of TB101.
	P105	K	JUNCTION PANEL	1 of TB101.
	P105	W	JUNCTION PANEL	2 of TB101.
3	P2	F	GROUP PANEL	8 OF TB1.
	P2	P	GROUP PANEL	7 OF TB1.
4	P1	small	600 VOLT POWER SUPPLY PLY	E OF TB1.
	P1	large	600 VOLT POWER SUPPLY PLY	F OF TB1.
	P3	A	600 VOLT POWER SUPPLY PLY	A OF TB1.
	P3	B	600 VOLT POWER SUPPLY PLY	B OF TB1.
5	P2	H	GROUP PANEL	9 OF T1.
	P2	R	GROUP PANEL	10 OF T1.
	P104	A	JUNCTION PANEL	5 OF TB101.
	P104	L	JUNCTION PANEL	6 OF RB101.
	P105	A	JUNCTION PANEL	5 OF TB101.
	P105	L	JUNCTION PANEL	6 OF TB101.
	P105	F	JUNCTION PANEL	5 OF FL101.
	P105	S	JUNCTION PANEL	6 OF FL101.
6	P1	H	GROUP PANEL	11 OF TB1.
	P1	R	GROUP PANEL	12 OF TB1.
	P2	H	GROUP PANEL	9 OF TB1.
	P2	R	GROUP PANEL	10 OF TB1.
	P105	C	JUNCTION PANEL	5 OF FL102.
	P105	P	JUNCTION PANEL	6 OF FL102.
7	P1	L	GROUP PANEL	1 OF TB1.
	P1	C	GROUP PANEL	2 OF TB1.
	P2	L	GROUP PANEL	1 OF TB1.
	P2	C	GROUP PANEL	2 OF TB1.
	P3	A	SUBGROUP PANEL	E31.
	P3	K	SUBGROUP PANEL	Ground (chassis).
8	P1	L	GROUP PANEL	1 OF TB1.
	P1	C	GROUP PANEL	2 OF TB1.
	P2	L	GROUP PANEL	1 OF TB1.
	P2	C	GROUP PANEL	2 OF TB1.
	P3	E	SUBGROUP PANEL	Tip contact of DEM OUT 1 jack.[1]
	P3	P	SUBGROUP PANEL	Ground (chassis).
9	P1	A	GROUP PANEL	3 OF TB1.
	P1	J	GROUP PANEL	4 OF TB1.
	P2	A	GROUP PANEL	3 OF TB1.
	P2	J	GROUP PANEL	4 OF TB1.
	P2	A	SUBGROUP PANEL	E16.
	P2	K	SUBGROUP PANEL	Ground (chassis).
10	P1	A	GROUP PANEL	3 OF TB1.
	P1	J	GROUP PANEL	4 OF TB1.
	P2	A	GROUP PANEL	3 OF TB1.
	P2	J	GROUP PANEL	4 OF TB1.
	P2	E	SUBGROUP PANEL	Tip contact of DEM OUT 2 jack. [2]
	P2	P	SUBGROUP PANEL	Ground (chassis).
11	P1	D	GROUP PANEL	5 OF TB1.
	P1	E	GROUP PANEL	6 OF TB1.
	P2	D	GROUP PANEL	5 OF TB1.
	P2	E	GROUP PANEL	6 OF TB1.
	P1	A	SUBGROUP PANEL	E1.
	P1	K	SUBGROUP PANEL	Ground (chassis).

See footnotes at the end of table.

Item No.	Cable		Terminating Point	
	Plug	Terminal	PANEL	Terminal
12	P1	D	GROUP PANEL	5 of TB1.
	P1	E	GROUP PANEL	6 of TB1.
	P2	D	GROUP PANEL	5 of TB1.
	P2	E	GROUP PANEL	6 of TB1.
	P1	E	SUBGROUP PANEL	Tip contact of DEM OUT 3 jack. [3]
	P1	P	SUBGROUP PANEL	Ground (chassis).
[4]13	P1	C	CARRIER SUPPLY PANEL	3 OF T19.
	P1	M	CARRIER SUPPLY PANEL	1 OF T19.
[4]13	P1	C	CARRIER SUPPLY PANEL	3 OF T19.
	P1	M	CARRIER SUPPLY PANEL	1 OF T19.
[4]13	P1	C	CARRIER SUPPLY PANEL	3 OF T19.
	P1	M	CARRIER SUPPLY PANEL	1 OF T19.
[4]14	P2	C	CARRIER SUPPLY PANEL	3 OF T19.
	P2	M	CARRIER SUPPLY PANEL	1 OF T19.
[4]15	P3	C	CARRIER SUPPLY PANEL	3 OF T19.
	P3	M	CARRIER SUPPLY PANEL	1 OF T19.
[4]16	P1	D	CARRIER SUPPLY PANEL	3 OF T17.
	P1	N	CARRIER SUPPLY PANEL	1 OF T17.
[4]17	P2	D	CARRIER SUPPLY PANEL	3 OF T17.
	P2	N	CARRIER SUPPLY PANEL	1 OF T17.
[4]18	P3	D	CARRIER SUPPLY PANEL	3 OF T17.
	P3	N	CARRIER SUPPLY PANEL	1 OF T17.
[4]19	P1	E	CARRIER SUPPLY PANEL	3 OF T20.
	P1	P	CARRIER SUPPLY PANEL	1 OF T20.
[4]20	P2	E	CARRIER SUPPLY PANEL	3 OF T20.
	P2	P	CARRIER SUPPLY PANEL	1 OF T20.
[4]21	P3	E	CARRIER SUPPLY PANEL	3 OF T20.
	P3	P	CARRIER SUPPLY PANEL	1 OF T20.
[4]22	P1	F	CARRIER SUPPLY PANEL	3 OF T15.
	P1	R	CARRIER SUPPLY PANEL	1 OF T15.
[4]23	P2	F	CARRIER SUPPLY PANEL	3 OF T15.
	P2	R	CARRIER SUPPLY PANEL	1 OF T15.
[4]24	P3	F	CARRIER SUPPLY PANEL	3 OF T15.
	P3	R	CARRIER SUPPLY PANEL	1 OF T15.
25	P101	K	JUNCTION PANEL	13 OF TB101.
	P101	W	JUNCTION PANEL	14 OF TB101.
	P102	C	JUNCTION PANEL	13 OF TB101.
	P102	P	JUNCTION PANEL	14 OF TB101.
26	P101	F	JUNCTION PANEL	3 OF FL102.
	P101	S	JUNCTION PANEL	4 OF FL102.
27	P102	H	JUNCTION PANEL	17 OF TB101.
	P102	U	JUNCTION PANEL	18 OF TB101.
	P104	H	JUNCTION PANEL	17 OF TB101.
	P104	U	JUNCTION PANEL	18 OF TB101.
	P1	F	SUBGROUP PANEL	U of J9.
	P1	R	SUBGROUP PANEL	H of J9.
	P2	F	SUBGROUP PANEL	U of J9.
	P2	R	SUBGROUP PANEL	H of J9.
	P3	F	SUBGROUP PANEL	U of J9.
	P3	R	SUBGROUP PANEL	H of J9.
28	P101	M	JUNCTION PANEL	4 OF FL101.
	P101	L	JUNCTION PANEL	3 OF FL101.
29	P102	K	JUNCTION PANEL	1 OF TB101.
	P102	W	JUNCTION PANEL	2 OF TB101.
30	P102	D	JUNCTION PANEL	3 OF TB101.
	P102	R	JUNCTION PANEL	4 OF TB101.

1 SPECIAL SERVICE 1 switch in CHAN MODEM position.
2 SPECIAL SERVICE 2 switch in CHAN MODEM position.
3 SPECIAL SERVICE 3 switch in CHAN MODEM position.
4 Normal indication approximately 22 ohms.

11. Tube Socket Voltage and Resistance Measurements

Note Remove plug-in assemblies from the chassis (par. 13) before performing resistance measurements.

To localize trouble within a particular circuit, make tube socket voltage and resistance measurements. Tube Socket Adapter Kit MX-1258/U provides test adapters which permit voltage and resistance measurements from the top of the chassis, Use Multimeter ME-77/U, or equal, to make these measurements. When the trouble has been localized, record the abnormal readings, the tube reference <resignation and pin number, and the PANEL on which the tube is located on the repair tag.

Warning: Disconnect all sources of voltage before measuring the tube socket resistances. When the power equipment is disconnected, some capacitors still may retain dangerous voltages. Short-circuit the capacitors to ground.

a. Use of Test Adapters. To use any particular test adapter, follow the procedures given below:

(1) Using a tube puller, pull the tube straight out of the circuit to be tested.
(2) Select the test adapter from the MX- 258/U which corresponds to the size and number of pins of the tube removed. Insert this adapter into the tube socket.
(3) Insert the removed tube into the test adapter.
(4) Make the desired measurements by connecting the meter probe to the terminal on the test adapter corresponding to the pin number of the tube.
(5) When the tests arc completed, remove the test adapter and replace the tube.

b. Tube Socket Voltage and Resistance Diagrams. The following chart lists the tube socket voltage and resistance diagrams for each PANEL or assembly.

Fig. No.	Panel or assembly (tube socket voltage and resistance diagram)
7	Telephone Test Set TS-760/TCC-7, chassis.
8	Telephone Test Set TS-760/TCC-7, IF amplifier AR1.
9	Telephone Test Set TS-760/TCC-7, flat amplifier AR2.
10	Telephone Modern TA-2191U, CHAN 1, 2, 3, or 4.
11	Telephone Carrier Frequency SUPPLY TA-228/TCC-7
12	Telephone Modem TA-227/U.
13	Amplifier-Pilot Regulator AM-707/TCC-7, GROUP PANEL , chassis.
14	Amplifier-Pilot Regulator A M-707/TCC-7, GROUP PANEL , 12-68 kc amplifier.
15	Amplifier-Pilot Regulator A M-707/TCC-7, GROUP PANEL , regulator and alarm Z6.
16	Amplifier-Pilot Regulator A M-707/TCC -7, GROUP PANEL , modem and amplifier AR4.
17	Receiver-Transmitter Order Wire RT-280/TCC7,transmitting amplifier AR101.
18	Receiver-Transmitter Order Wire RT-280/TCC7, receiving amplifier AR102.
19	Receiver-Transmitter Order Wire RT-280/TCC-7, ringer oscillator Y101.
20	Power SUPPLY PP-827/U.
21	Power SUPPLY PP-826 (*)/U.

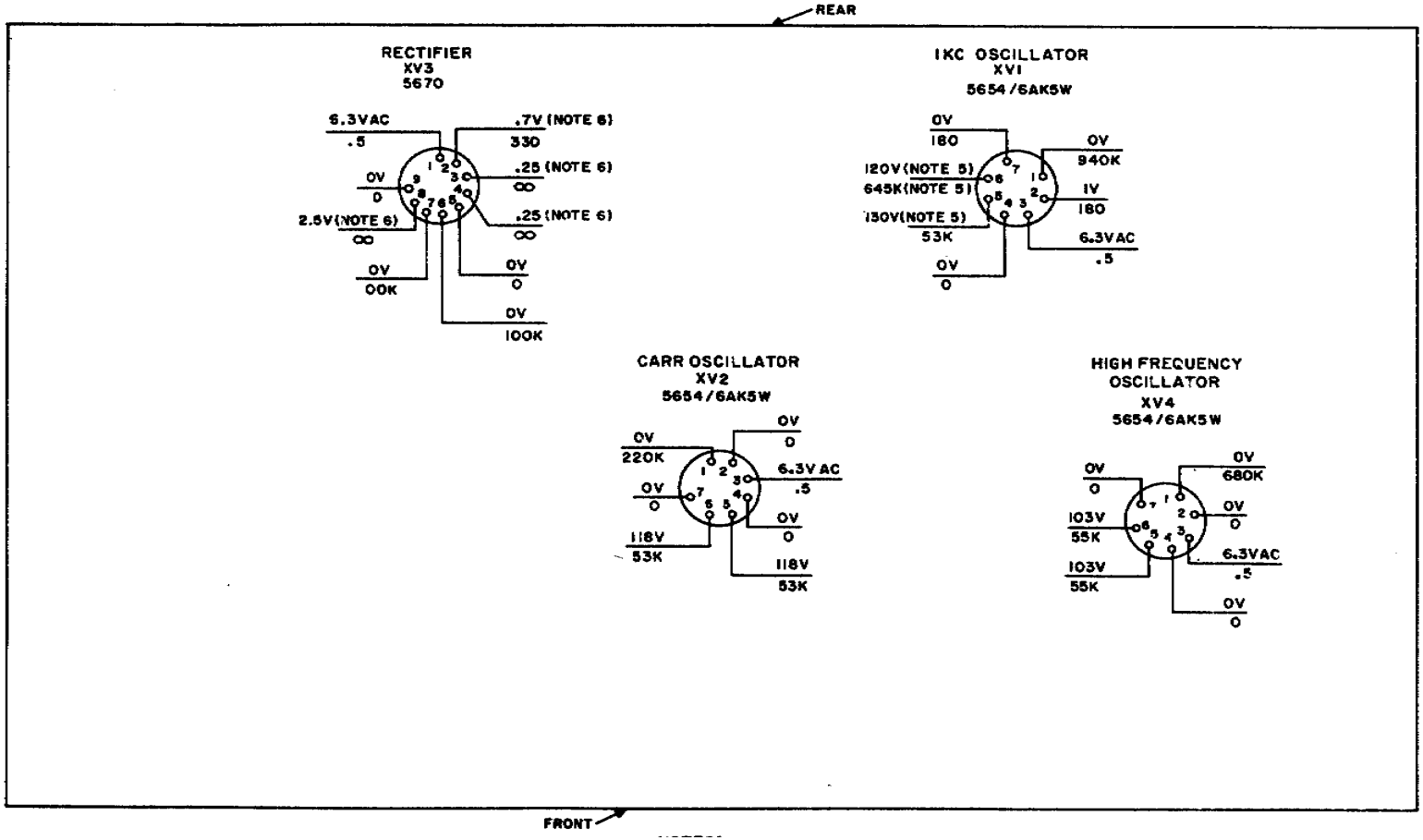
12. Tube Testing and Replacement

Note. Preferred-type tubes for use in Telephone Terminal AN/TCC-7 and tube location diagrams are listed in TM11-2139-10.

When trouble is reported, cheek all control settings, cabling, and connections before testing any tubes. If tube failure is suspected, use Electron Tube Test Set TV-7/U and check the tubes as follows:

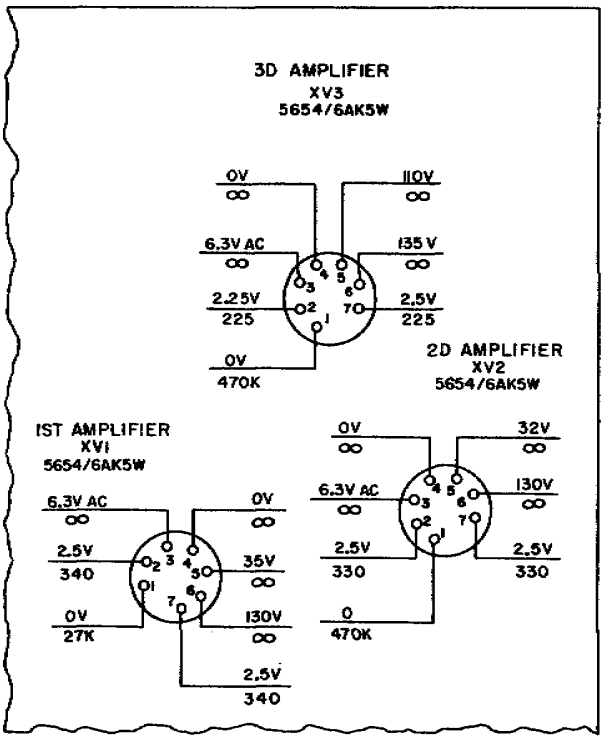
a. Prepare the tube tester for use in accordance with the instructions in TM l1-5083, Electron Tube Test Set TV-7/U, and the test data (TB 11-5083-1) mounted on the inside cover of the tube tester

.



NOTES

1. DO NOT ATTEMPT TO MAKE RESISTANCE MEASUREMENTS WITH POWER ON.
2. VOLTAGE MEASUREMENTS ARE SHOWN ABOVE LINE, RESISTANCE MEASUREMENTS BELOW.
3. DC VOLTAGE MEASUREMENTS ARE TAKEN WITH A 20, 000 OHMS -PER-VOLT METER.
4. ALL MEASUREMENTS ARE MADE FROM TEST POINT TO GROUND (CHASSIS).
5. ADJUST IKC CONTROL TO MAXIMUM CLOCKWISE POSITION.
6. USE METER RANGE OF 2.5V FOR THIS MEASUREMENT.
7. UNLESS OTHERWISE SHOWN. VOLTAGES ARE DC.



NOTES:

1. DO NOT ATTEMPT MAKE RESISTANCE MEASUREMENTS WITH POWER ON.

2. VOLTAGE MEASUREMENTS ARE SHOWN ABOVE LINE, RESISTANCE MEASUREMENTS BELOW .

3. DC VOLTAGE MEASUREMENTS ARE TAKEN WITH A. 20,00C-OHUS-PER-VOLT-14ETER.

4. ALL MEASUREMENTS ARE MADE FROM TEST POINT TO GROUND (CHASSIS)`

5. UNLESS OTHERWISE SHOWN. VOLTAGES ARE DC

TM 2139 -20- 9

Figure 8. Telephone Test Set TS-760/TCC-7, IF amplifier AR1, tube socket voltage and resistance diagram

b. Remove and test one tube at a time.

Caution*:* Never rock or rotate a tube when removing it from a socket; pull it straight out with a tube puller.

c. Discard a tube only if its defect is obvious or if the tube tester shows it to be defective. Do not discard a tube that tests at or slightly above its minimum test limits.

d. Replace the original tube, or install a new one if required, before testing the next one.

e. Replace the tube shield.

13. Removal and Replacement of Plug-in Assembly

(figs. 3-5)

a. Removal. The plug-in assemblies of Telephone Terminal AN/TCC-7 are secured to the chassis by captive screws which are circled by a black ring. To remove a plug-in assembly, loosen the captive screws and carefully lift the assembly part way out of its position. Remove any cables connecting the assembly to the chassis. Be careful not to damage any parts that may be close to the unit.

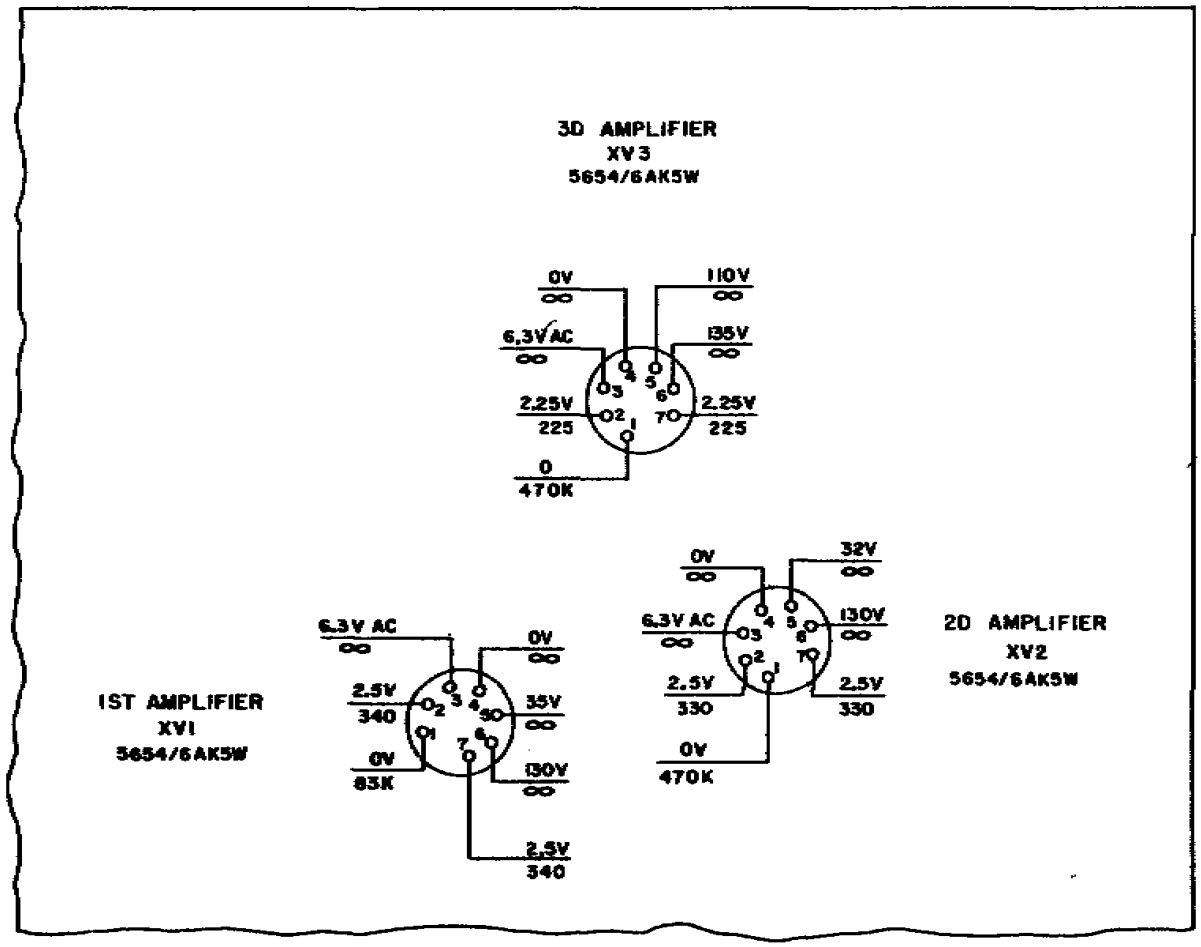
b. Replacement. The sequence for replacing a plug-in assembly is the reverse of the removal procedures (a above).

14. Removal and Replacement of Channel Assembly

(fig. 6)

a. Removal. To remove one of the CHAN assemblies from a CHAN MODEM, follow the procedures given below:

(1) Disconnect the cables from the CARR
SUP - POWER and TRANS - TEST -



NOTES:

1. DO NOT ATTEMPT TO MAKE RESISTANCE MEASUREMENTS WITH POWER ON.
2. VOLTAGE MEASUREMENTS ARE SHOWN ABOVE LINE, RESISTANCE MEASUREMENTS BELOW .
3. DC VOLTAGE MEASUREMENTS ARE TAKEN WITH A 20,000- OHMS - PER-VOLT METER.
4. ALL MEASUREMENTS E ARE MADE FROM TEST POINT TO GROUND (CHASSIS).
5. UNLESS OTHERWISE SHOWN, VOLTAGES ARE DC.

TM2139-20-10

Figure 9. Telephone Test Set TS-760/TCC-7, flat amplifier AR2 tube socket voltage and resistance diagram.

TALK connectors on the front panel of the CHAN MODEM.

(2) Loosen the two captive screws on the front panel of the CHAN MODEM.CHAN Grasp the handle on the front panel and withdraw the CHAN MODEM from its transit case.

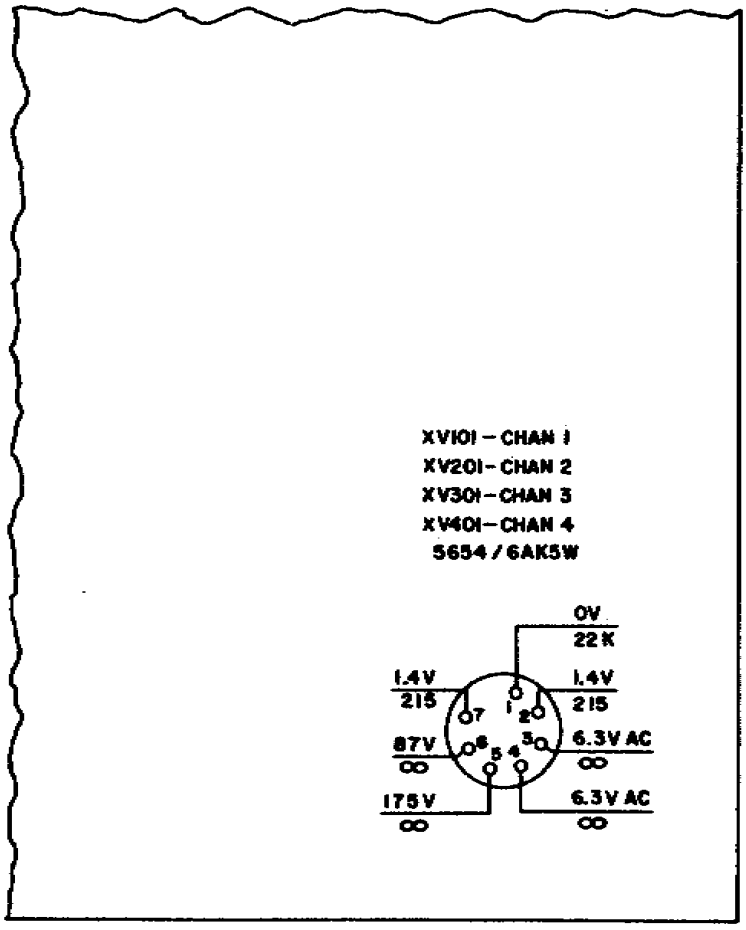
(3) A screw passes through the front panel of the CHAN MODEMdirectly above each of the four CHAN assemblies. A and washer on the screw hold the front plate of the CHAN assembly to the front panel of the CHAN MODEM Hold the nut and washer and remove the screw

(4) Two captive screws hold each CHAN assembly in place on the CHAN MODEM chassis. Loosen the captive screws of the CHAN assembly being removed.

(5) Grasp the binding posts and the rear of the CHAN assembly. Carefully raise the assembly until the binding posts line up with the top of the opening on the. front panel of the CHAN MODEM

(6) Withdraw the CHAN assembly by moving nut it back from the front panel of the CHAN MODEM.

b. *Replacement.* The sequence for replacing one CHAN assemblies is the reverse of the removal procedures *(a above).*

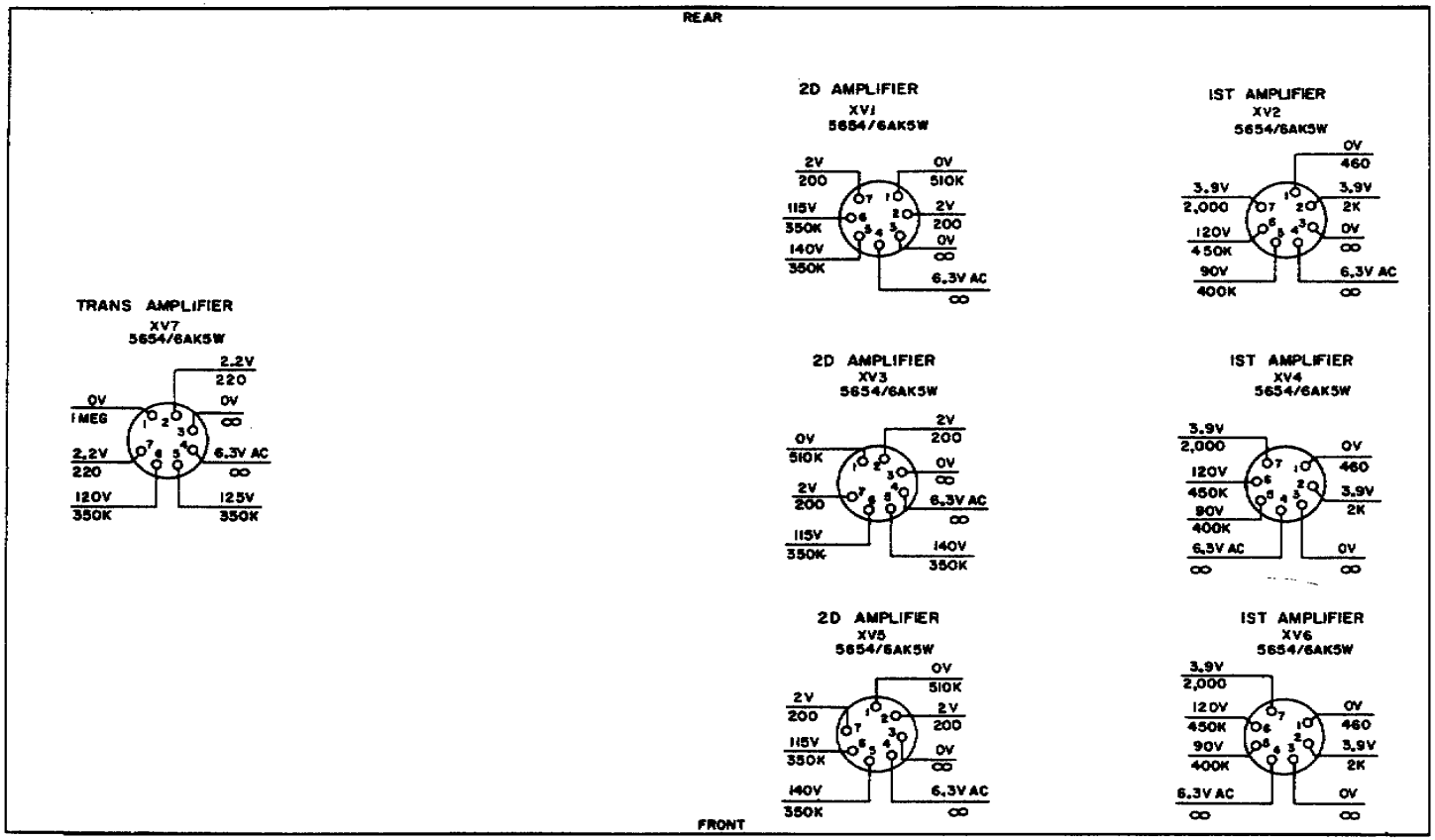


NOTES:

1. DO NOT ATTEMPT TO MAKE RESISTANCE MEASUREMENTS WITH POWER ON.
2. VOLTAGE MEASUREMENTS ARE SHOWN ABOVE LINE, RESISTANCE MEASUREMENTS BELOW.
3. DC VOLTAGE MEASUREMENTS ARE TAKEN WITH A 20,000 - OHMS - PER -VOLT METER.
4. ALL MEASUREMENTS ARE MADE FROM TEST POINT TO GROUND (CHASSIS).
5. UNLESS OTHERWISE SHOWN, VOLTAGES ARE DC.

TM2139 - 20 - 2

Figure 10. Telephone Modem TA-219/U, CHAN 1, 2, 3, or 4, tube socket voltage and resistance diagram.



NOTES1.

1 DO NOT ATTEMPT TO MAKE RESISTANCE MEASUREMENTS WITH POWER ON.

2. VOLTAGE MEASUREMENTS ARE SHOWN ABOVE LINE RESISTANCE MEASUREMENTS BE LOW

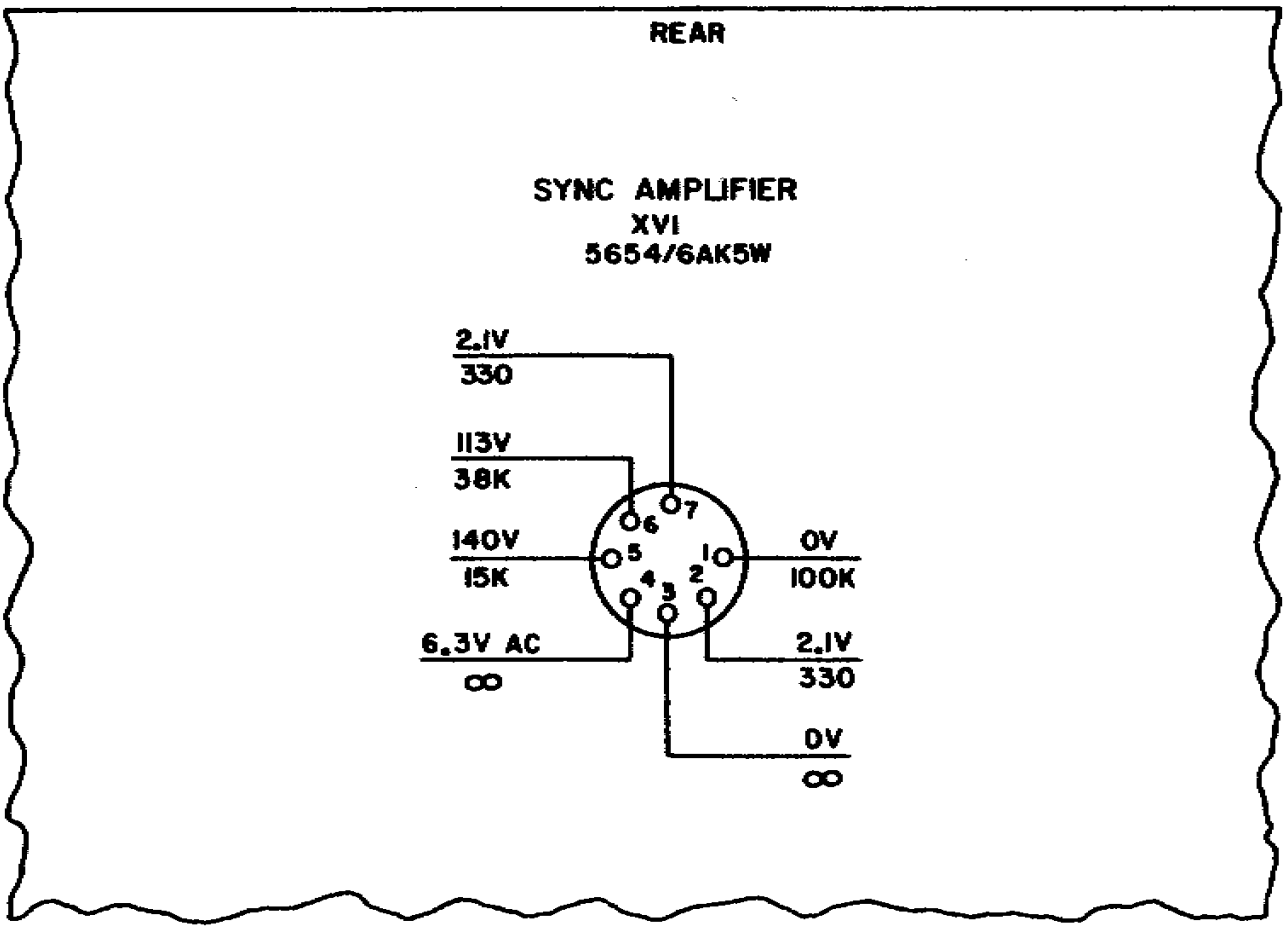
3, DC VOLTAGE MEASUREMENTS ARE TAKEN WITH A 20,000-OHMS-PER-VOLT METER

4. ALL MEASUREMENTS ARE MADE FROM TEST POINT TO GROUND [CHASSIS}.

5. UNLESS OTHERWISE SHOWN, VOLTAGES ARE DC.

TM2139-20-3

Figure 12. Telephone Modem TA-227/U, tube socket voltage and resistance diagram.

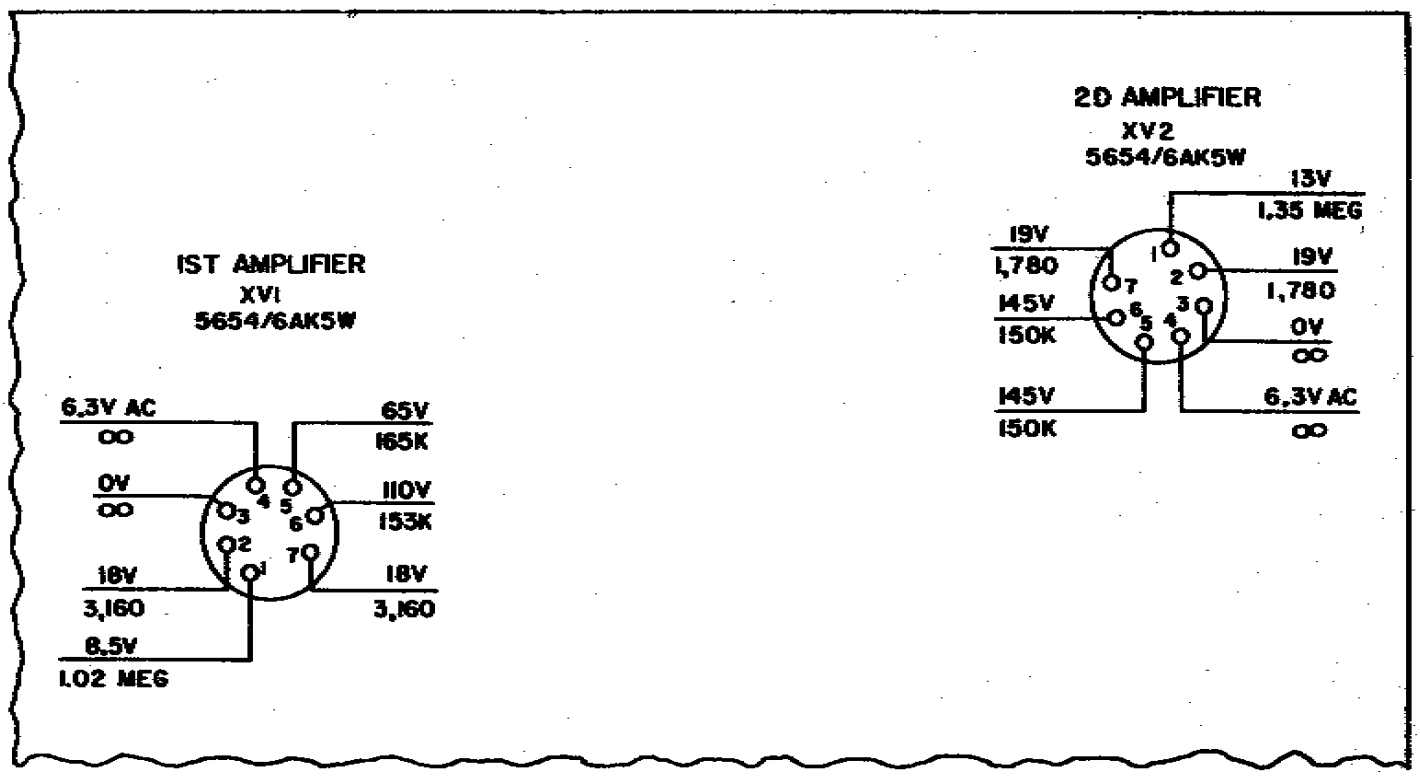


NOTES:

1. DO NOT ATTEMPT TO MAKE RESISTANCE MEASUREMENTS WITH POWER ON.
2. VOLTAGE MEASUREMENTS ARE SHOWN ABOVE LINE, RESISTANCE MEASUREMENTS BELOW.
3. DC VOLTAGE MEASUREMENTS ARE TAKEN WITH A 20,000-OHMS-PER-VOLTMETER.
4. ALL MEASUREMENTS ARE MADE FROM TEST POINT TO GROUND (CHASSIS).
5. UNLESS OTHERWISE SHOWN, VOLTAGES ARE DC.

TM2139-20-4

Figure 13. Amplifier-Pilot Regulator AM-707/TCC-7, GROUP PANEL, chassis, tube socket voltage and resistance diagram.

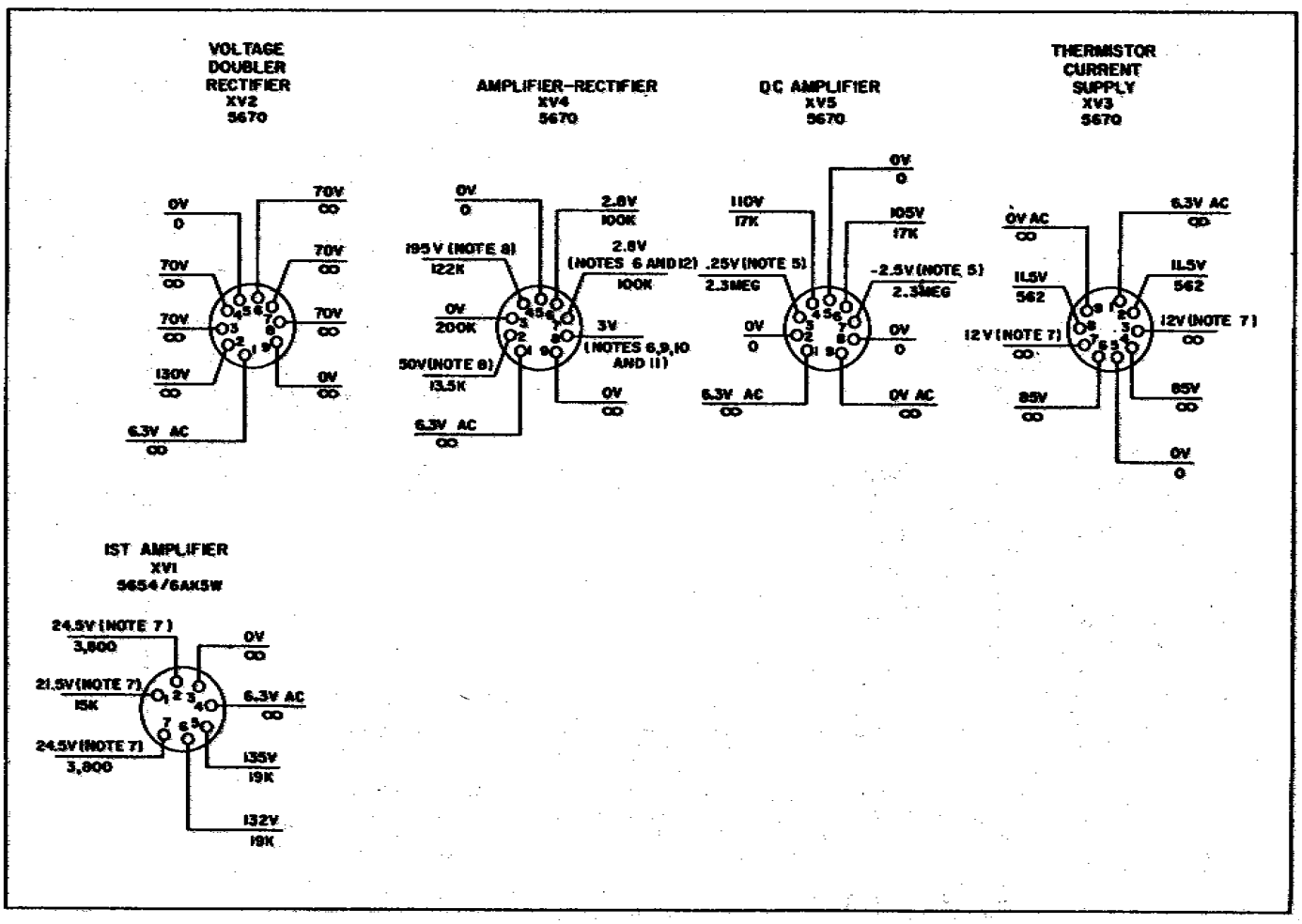


NOTES:

1. DO NOT ATTEMPT TO MAKE RESISTANCE MEASUREMENTS WITH POWER ON.
2. VOLTAGE MEASUREMENTS ARE SHOWN ABOVE LINE, RESISTANCE MEASUREMENTS BELOW.
3. DC VOLTAGE MEASUREMENTS ARE TAKEN WITH A 20,000-OHM-PER-VOLTMETER.
4. ALL MEASUREMENTS ARE MADE FROM TEST POINT TO GROUND (CHASSIS).
5. UNLESS OTHERWISE SHOWN, VOLTAGES ARE DC.

TM 2139-20-5

Figure 14. Amplifier-Pilot Regulator AM-707/TCC-7, GROUP PANEL, 12-68 kc amplifier, tube socket voltage and resistance diagram.



NOTES:

1. DO NOT ATTEMPT TO MAKE RESISTANCE MEASUREMENTS WITH POWER ON.

2. VOLTAGE MEASUREMENTS ARE SHOWN ABOVE LINE, RESISTANCE MEASUREMENTS BELOW.

3. DC VOLTAGE MEASUREMENT ARE TAKEN WITH A 20,000-OHMS-PER-VOLT METER.

4. ALL MEASUREMENTS ARE MADE FROM TEST POINT TO GROUND (CHASSIS).

5. METER RANGE OF 2.5V TO BE USED FOR THIS MEASUREMENT.

6. METER RANGE or 10V TO BE USED FOR: THIS MEASUREMENT.

7. METER RANGE OF 50V TO BE USED FOR THIS MEASUREMENT.

8. METER RANGE OF 250V TO BE USED FOR THIS MEASUREMENT.

9. ALARM TEST SWITCH IN NORMAL POSITION FOR READING OF 240K.

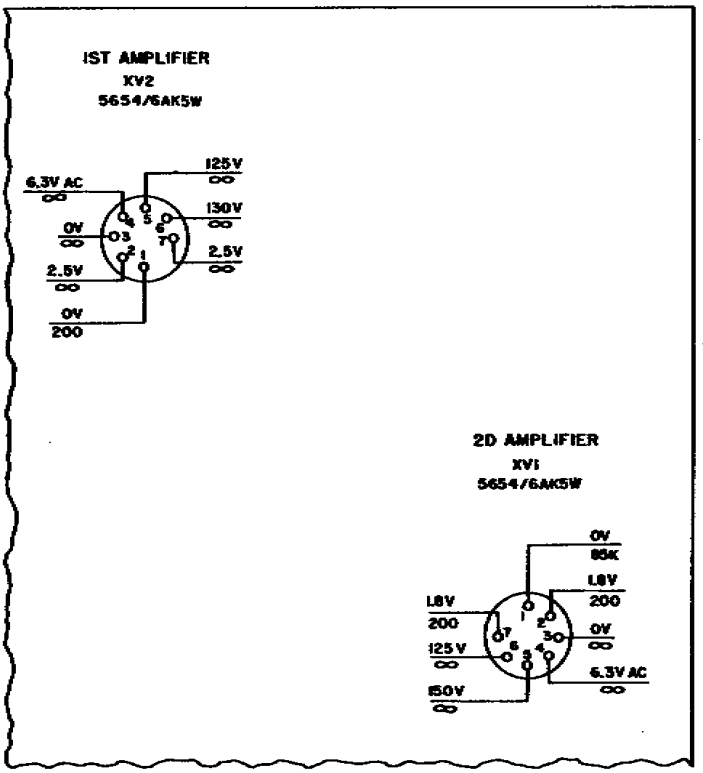
10. ALARM TEST SWITCH IN 1 HIGH POSITION FOR READING OF 10K.

11. ALARM TEST SWITCH IN 2 LOW POSITION FOR READING OF 280K.

12. SHORT E16 TO GROUND FOR THIS MEASUREMENT

13. UNLESS OTHERWISE SHOWN, VOLTAGES ARE DC.

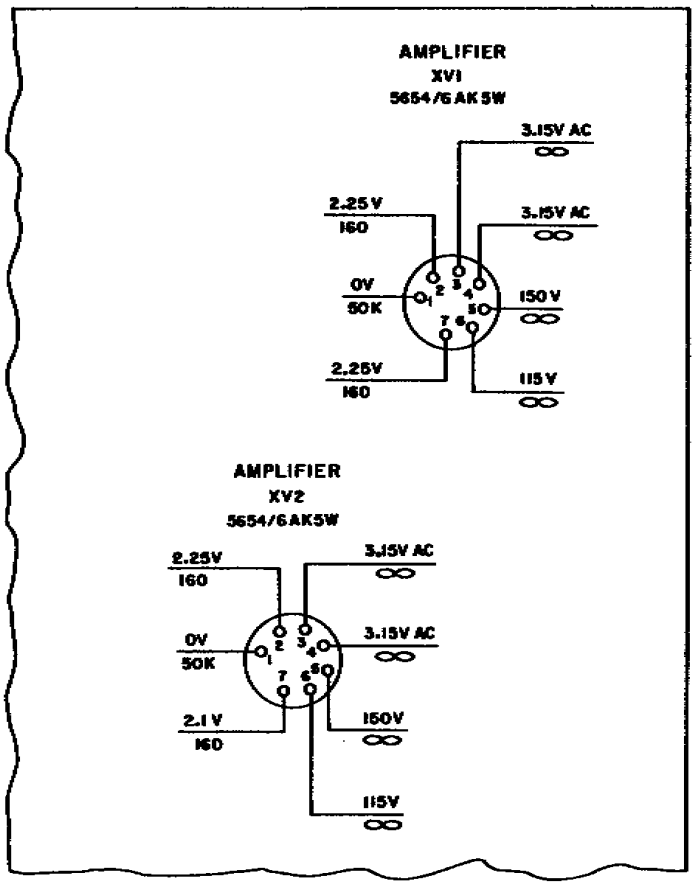
Figure 16. Amplifier-Pilot Regulator AM-707/TCC 7, GROUP PANEL, regulator and alarm Z6, tube socket voltage and resistance diagram.



NOTES

1. DO NOT ATTEMPT TO MAKE RESISTANCE MEASUREMENTS WITH POWER ON.
2. VOLTAGE MEASUREMENTS ARE SHOWN ABOVE LINE. RESISTANCE MEASUREMENTS BELOW.
3. DC VOLTAGE MEASUREMENTS; ARE TAKEN WITH A 20,000 OHMS-PER-VOLT METER
4. ALL MEASUREMENTS ARE MADE FROM TEST POINT TO GROUND (CHASSIS).
5. UNLESS OTHERWISE SHOWN, VOLTAGES ARE DC.

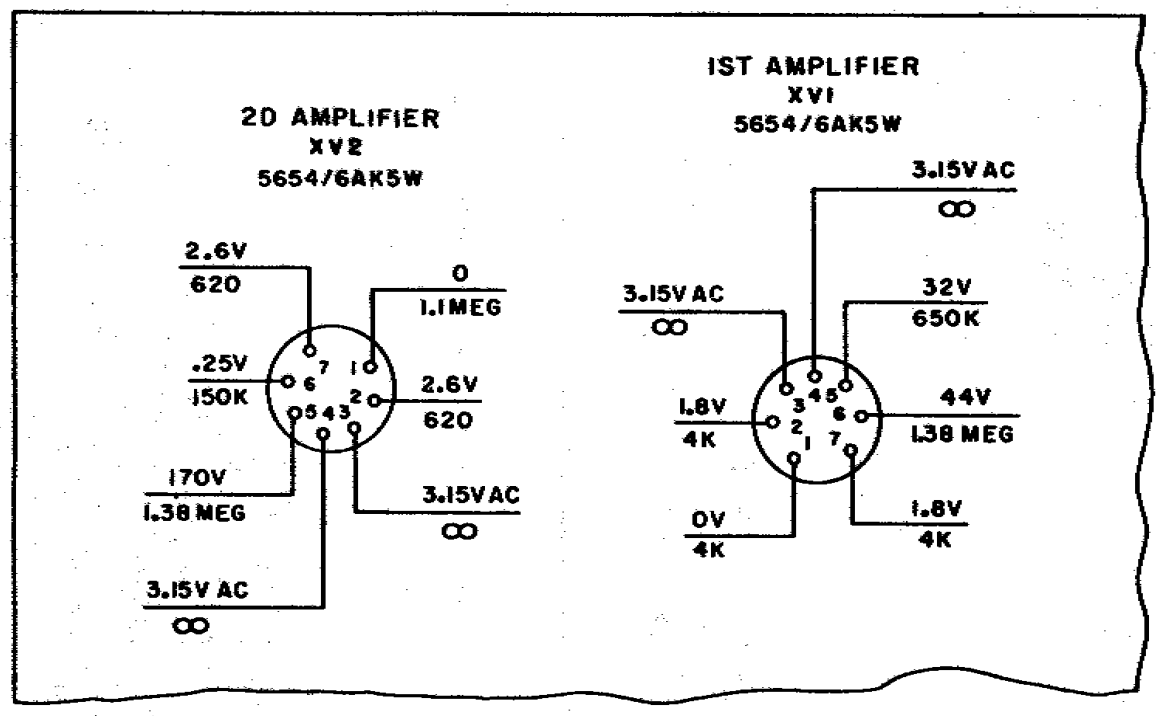
Figure 16. AMPLIFIER-PILOT Regulator AM-707/TCC-7, GROUP PANEL, modem and amplifier AR4 tube socket voltage and resistance diagram .



NOTES

1. DO NOT ATTEMPT TO MAKE RESISTANCE MEASUREMENTS WITH POWER ON.
2. VOLTAGE MEASUREMENTS ARE SHOWN ABOVE LINE, RESISTANCE MEASUREMENTS BELOW.
3. DC VOLTAGE MEASUREMENTS ARE TAKEN WITH A 20,000-OHMS PER-VOLT METER.
4. ALL MEASUREMENTS ARE MADE FROM TEST POINT TO GROUND {CHASSIS).
5. UNLESS OTHERWISE SHOWN, VOLTAGES ARE DC.

Figure 17. Receiver-Transmitter Order Wire RT-280/ TCC-7, transmitting amplifier AR101, tube socket voltage and resistance diagram

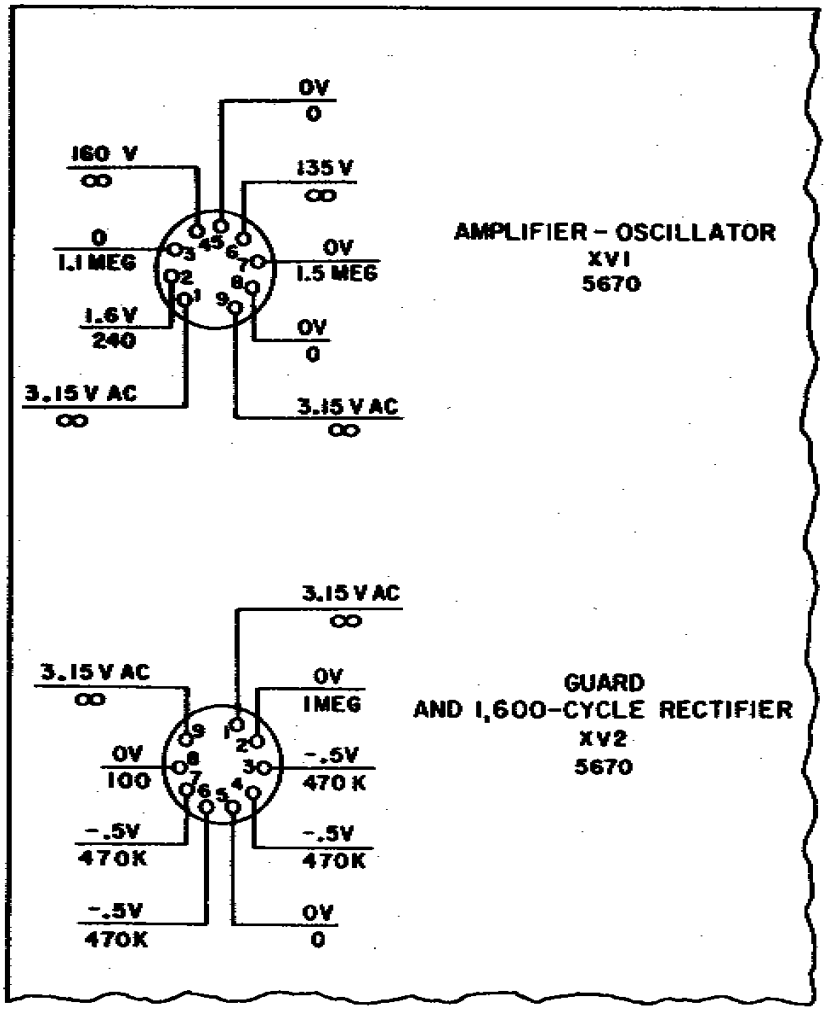


NOTES

1. DO NOT ATTEMPT TO MAKE RESISTANCE MEASUREMENTS WITH POWER ON.
2. VOLTAGE MEASUREMENTS ARE SHOWN ABOVE LINE, RESISTANCE MEASUREMENTS BELOW.
3. DC VOLTAGE MEASUREMENTS ARE TAKEN WITH A 20,000- PER-VOLT METER.
4. ALL MEASUREMENTS ARE MADE FROM TEST POINT TO GROUND (CHASSIS).
5. UNLESS OTHERWISE SHOWN, VOLTAGES ARE DC.

TM 2139-20-12

Figure 18. Receiver-Transmitter Order Wire RT-280/TCC-7, receiving amplifier AR102, tube socket voltage and resistance diagram

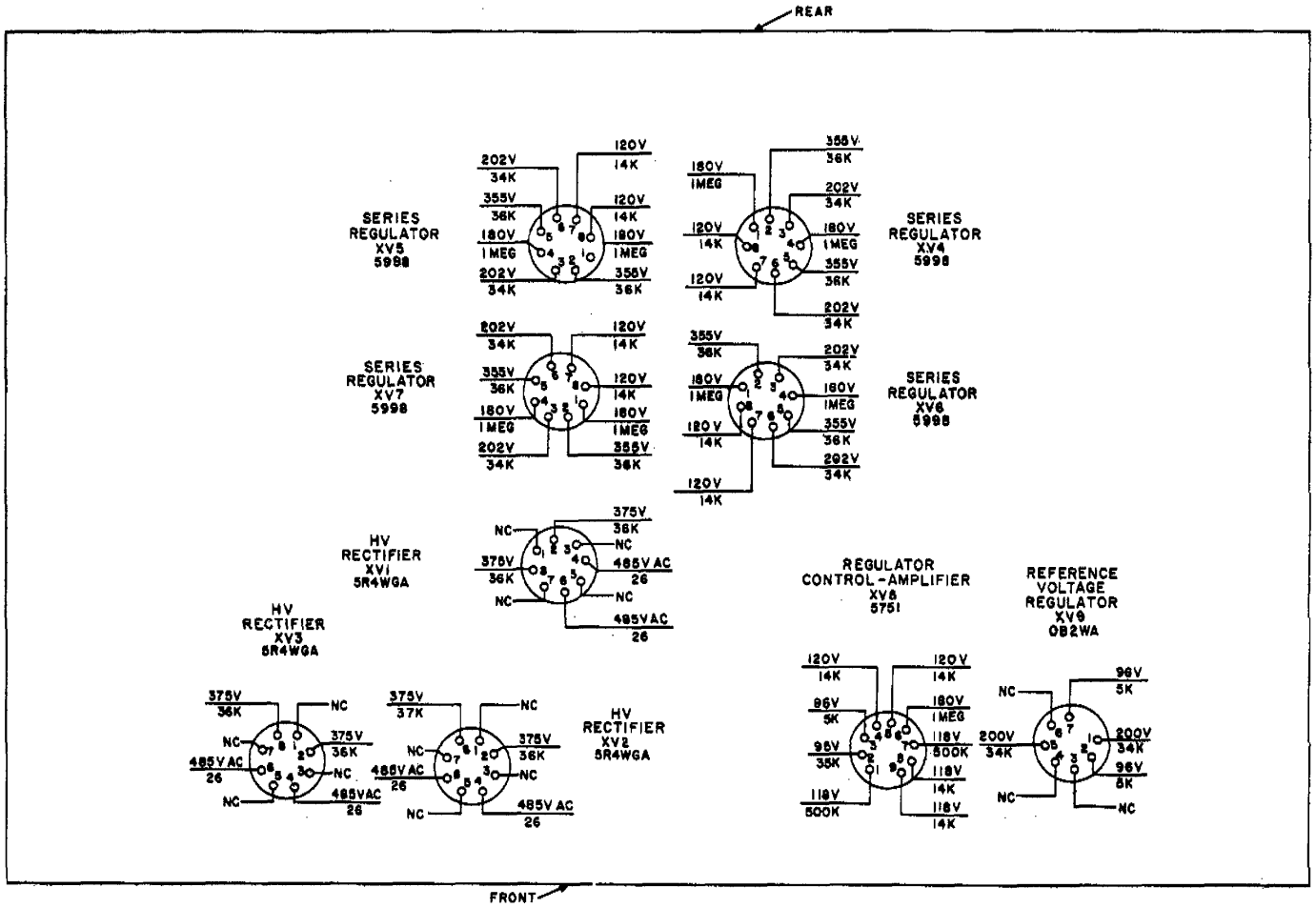


NOTES:

1. DO NOT ATTEMPT TO MAKE RESISTANCE MEASUREMENTS WITH POWER ON.
2. VOLTAGE MEASUREMENTS ARE SHOWN ABOVE LINE, RESISTANCE MEASUREMENTS BELOW
3. DC VOLTAGE MEASUREMENTS ARE TAKEN WITH A 20,000 OHMS -PER-VOLT METER.
4. ALL MEASUREMENTS ARE MADE FROM TEST POINT TO GROUND {CHASSIS).
5. UNLESS OTHERWISE SHOWN, VOLTAGES ARE DC.

TM 2139-20-12

Figure 19. Receiver-Transmitter Order Wire RT-280/TCC-7, ringer oscillator Y101, tube socket voltage and resistance diagram



NOTES

1. DO NOT ATTEMPT TO MAKE RESISTANCE MEASUREMENTS WITH POWER ON.

2. VOLTAGE MEASUREMENTS ARE SHOWN ABOVE LINE, RESISTANCE MEASUREMENTS BELOW.

3. FILAMENT VOLTAGES ARE GIVEN IN POWER SUPPLY PP-827/U SCHEMATIC DIAGRAM.

4. DC VOLTAGE MEASUREMENTS ARE TAKEN WITH A 20,000 OHMS - PER-VOLT METER.

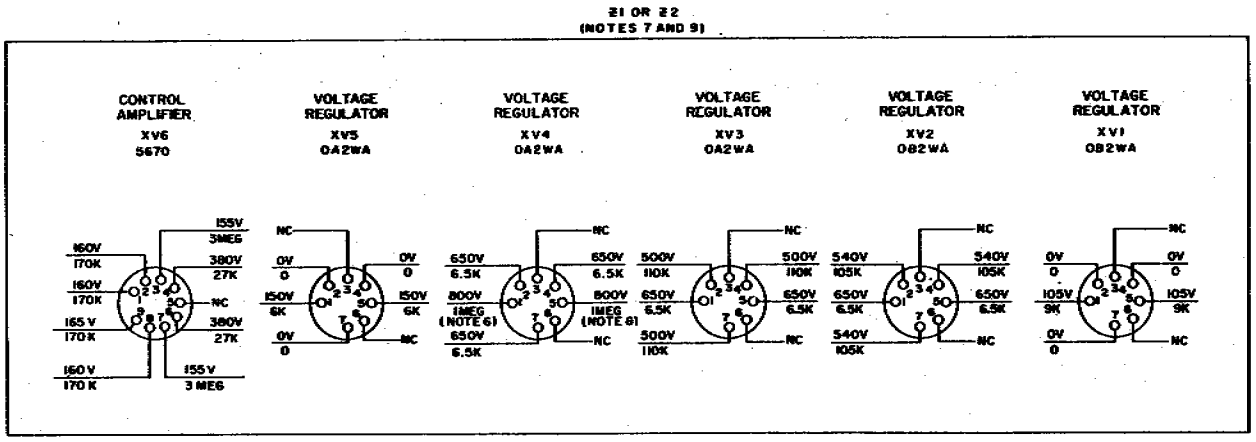
5. ALL MEASUREMENTS ARE MADE FROM TEST POINT TO GROUND {CHASSIS).

6. NC INDICATES NO CONNECTION.

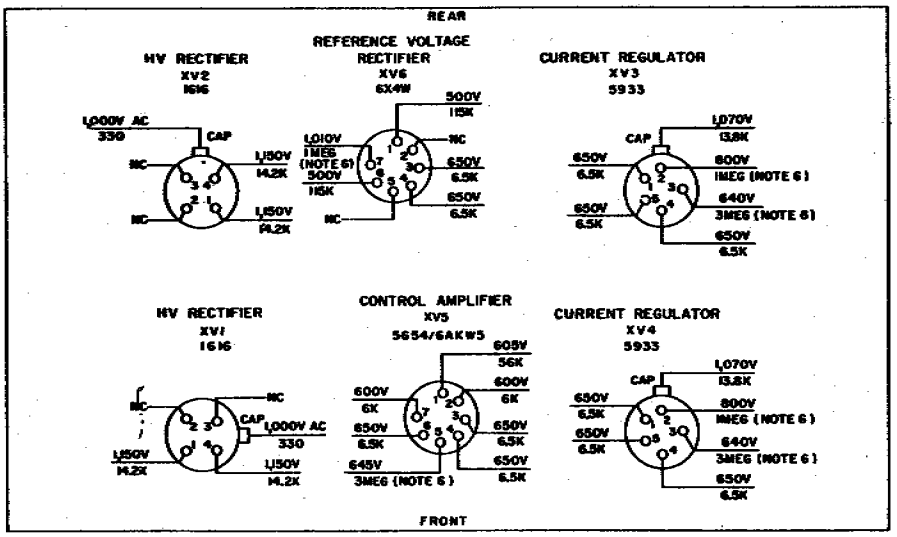
7. UNLESS OTHERWISE SHOWN, VOLTAGES ARE DC.

TM 2139-20-15

Figure 20. Power Supply PP-827/U, tube socket voltage and resistance diagram.



600 VOLT POWER SUPPLY PANEL



NOTES:

1. DO NOT ATTEMPT TO MAKE RESISTANCE MEASUREMENTS WITH POWER ON.

2. VOLTAGE MEASUREMENTS ARE SHOWN ABOVE LINE, RESISTANCE MEASUREMENTS BELOW.

3. DC VOLTAGE MEASUREMENTS ARE TAKEN WITH A 20,000-OHMS-PER VOLT METER.

4. ALL MEASUREMENTS ARE MADE FROM TEST POINT TO GROUND (CHASSIS).

5. NC INDICATES NO CONNECTION.

6. READING AFTER METER NEEDLE COMES TO REST POSITION.

7. VOLTAGE AND RESISTANCE READINGS TAKEN WITH LOW VOLTAGE RECTIFIER AND ALARM PLUGGED INTO 600 VOLT POWER SUPPLY PANEL. THE REPEATER SWITCH ON THE 600 VOLT POWER SUPPLY PANEL IS IN TEST POSITION.

8. UNLESS OTHERWISE SHOWN, VOLTAGES ARE DC.

9. ALL VOLTAGES AND RESISTANCE'S ARE THE SAME FOR POWER SUPPLIES PP-826/U AND PP-826A/U.

Figure 21. Power Supply PP-826(*)/U, tube socket voltage and resistance diagram.

CHAPTER 3

BLOCK DIAGRAM THEORY OF TELEPHONE TERMINAL AN/TCC-7

15. General

a. Telephone Terminal AN/TCC-7 is used as terminal equipment in a carrier communication system (TM 11-2139-10). The system provides facilities for two-way transmission of 12 telephone channels and an order-wire channel over non loaded spiral-four cable and/or radio systems for distances up to approximately 200 miles. The transmitting circuits (par. 16) in the terminal translate 12 voice-frequency (vf) channels, in a three-step operation, into carrier frequency channels for transmission over the spiral-four cable to a repeater or radio set. The receiving circuits (par. 17) in the terminal translate the frequencies received from the spiral-four cable back into 12 vf channels. The ORDER WIRE PANEL (par. 18) contains circuits for ringing, talking, and listening to attended points in the carrier communication system. The TEST PANEL (par. 19) contains circuits for testing the terminal and supplying test frequencies to the GROUP PANEL. The CARRIER SUPPLY PANEL (par. 20) supplies channel carrier frequencies, subgroup carrier frequencies, and pilot and test frequencies. Power supplies (par. 21) in the terminal furnish power to the components within the terminal and feed power out over the spiral-four cable to unattended repeaters.

b. Test jacks, for use during initial adjustments and tests and system line-up (TM 11-2139-10) and for use by maintenance personnel in localizing trouble to a defective panel or assembly, are lot cased on the front panel or chassis of the following components:

ORDER WIRE PANEL
TEST PANEL
CARRIER SUPPLY PANEL
GROUP PANEL
SUBGROUP PANEL
600 VOLT POWER SUPPLY (chassis only)
200 VOLT POWER SUPPLY (chassis only)

16. Telephone Terminal AN/TCC- 7, Transmitting Circuits

(fig. 26)

The voice-frequency facilities are connected to Telephone Terminal AN/TCC-7 on a two-wire or four-wire basis. Four circuits may be connected to each of the three CHAN MODEMS. The transmitting circuits through the terminal are as follows:

a. CHAN MODEMS. Four vf channels are modulated separately in each CHAN MODEM with four different carrier frequencies: 8, 12, 16, and 20 kilocycles (kc). The resultant lower sideband of each channel is selected by a filter for transmission. The CHAN MODEM output frequencies (4 to 20 kc) of each CHAN MODEM are applied to the SUBGROUP PANEL.

b. SUBGROUP PANEL. The output frequencies from CHAN MODEM 1, CHAN MODEM 2, and CHAN MODEM 3 are modulated with carrier frequencies of 56, 72, and 88 kc, respectively. The upper sidebands are selected by filters. The three output frequency bands (60 to 76 kc, 76 to 92 kc, and 92 to 108 kc) from the subgroup transmitting circuits are applied as a single band (60 to 108 kc) through the JUNCTION PANEL to modem and amplifier AR 4 in the GROUP PANEL.

c. GROUP PANEL (fig. 22). The subgroup output frequencies are modulated with a 120-kc carrier frequency and amplified in modem and amplifier AR4. The lower sideband (12 to 60 kc) is selected by a filter and applied to transmitting amplifier AR3. Also, pilot and test frequencies from the CARRIER SUPPLY PANEL and test frequencies from the TEST PANEL are applied to transmitting amplifier AR3. The amplifier group output frequencies and pilot and test frequencies from transmitting amplifier AR3 are applied to the JUNCTION PANEL.

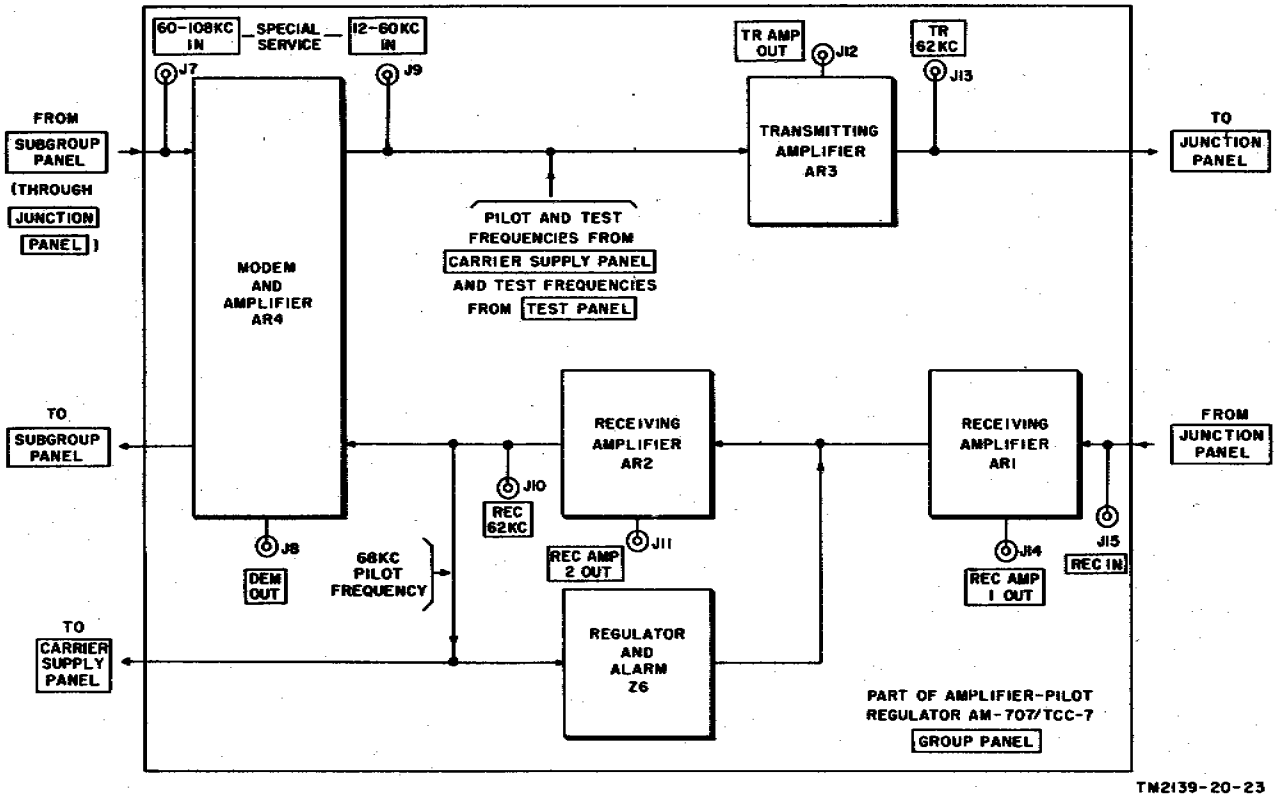


Figure 22 Amplifier-pilot Regulator AM-707/TCC-7, GROUP PANEL, simplified block diagram.

d. JUNCTION PANEL (fig. 26). The group and output frequencies and test and pilot frequencies are applied through the high-pass filter to the output repeating coil. The output repeating coil passes the signals and dc voltage (introduced into the secondary of the coil) from the 600 VOLT POWER SUPPLY (par. 21b) to the non loaded spiral-four cable. The order-wire frequencies (300 to 1,700 cycles per second (cps)) from the ORDER WIRE PANEL (par. 18a(1)) are passed through the low-pass filter and the output repeating coil to the non loaded spiral-four cable. The frequencies are applied through the spiral-four cable to the repeater or radio set.

17. Telephone Terminal AN/TCC-7, Receiving Circuits

(fig. 26)

The output frequencies from the repeater or radio set are connected through the non loaded spiral-four cable to the JUNCTION PANEL. The receiving circuits through the terminal are as follows:

a. *JUNCTION PANEL.* The incoming frequencies are applied through the input repeating coil to a high-pass and low-pass filter. The highpass filter passes the group input frequencies (1260 kc) and the test and pilot frequencies to receiving amplifier AR1 in the GROUP PANEL. The low-pass filter passes the order-wire frequencies (300 to 1,700 cps) to the ORDER WIRE PANEL (par. 18a (2)).

b. GROUP PANEL (fig. 22). The group input frequencies and test and pilot frequencies are amplified in receiving amplifier AR1 and applied to receiving amplifier AR2. The amplifier group input frequencies from receiving amplifier AR2 are applied to modem and amplifier AR4. In modem and amplifier AR4, the group input frequencies are modulated with a 120-kc carrier frequency and amplified. The lower sideband (60 to 108 kc) is selected by a filter and passed to the SUBGROUP PANEL (c below). The amplified 68-kc pilot frequency from receiving amplifier AR2 is applied to the synchronizing circuit in the CARRIER SUPPLY PANEL (par. 20b) and to regulator and alarm Z6. The output of regulator and alarm Z6 controls the input level to receiving amplifier AR2 so that the circuit operates to maintain a relatively constant output over a con

siderable input range. If the level of the received 68-kc pilot frequency increases more than 1 db above the normal input level, the HIGH ALARM lamp lights and the buzzer sounds; if the level of the received 68-kc pilot frequency decreases more than 1 db below the normal level, the LOW ALARM lamp lights and the buzzer sounds.

c. SUBGROUP PANEL (fig. 26). The subgroup input frequencies (60 to 108 kc) are separated by filters into channels identical with those in the transmitting circuits (par. 16b), and modulated with three carrier frequencies of 56, 72, and 88 kc. The resulting three CHAN MODEM input frequencies (4 to 20 kc) are applied to their respective CHAN MODEM.

d. CHAN MODEMS. The CHAN MODEM input frequencies from the SUBGROUP PANEL are separated by filters into channels identical with those in the transmitting circuits (par. 16a) and demodulated with four carrier frequencies back into vf channels (300 to 3,500 cps). The vf channels are connected to their respective voice-frequency facilities on a two-wire or four-wire basis

18. Order Wire Panel

(fig. 26)

The ORDER WIRE PANEL provides facilities for transmitting and receiving signals in a vf band of 300 cps to 1,700 cps independent of carrier transmission. Handset HS101, supplied with the ORDER WIRE PANEL, provides a means for voice communication over the order, wire circuit to the other terminal in the system, attended repeaters, and unattended repeaters. An order-wire ringer-oscillator provides a means for ringing the other terminal and attended repeaters, and for receiving a ringing signal from another terminal, attended repeaters, and unattended repeaters. Signaling is not provided for the carrier channels. Handset HS101 can also be used for communication to the other terminal over any of the 12 carrier channels and to the attendant of the local switchboard.

a. Transmission Circuit (fig. 23). With ORDER WIRE switch S104 in the TALK position, transmitting and receiving voice signals is possible over the order-wire circuit.

(1) *Transmitting*. Voice signals from the transmitter of handset HS101 pass through switch S104 to transmitting amplifier AR101. The signal is then amplified and applied to the JUNCTION PANEL (par. 16d).

(2) Receiving. Voice signals from the JUNCTION PANEL (par. 17a) are applied to receiving amplifier AR102. The signal is then amplified and applied through switch S104 to the receiver of handset HS101.

b. Ringer-Oscillator Circuit (fig. 23).

(1) *Ringer circuit (receiving)*. With ORDER WIRE switch S104 in either the TALK or non operated position, ringer-oscillator Y101 is connected to amplify and rectify incoming ringing signals (1,600 cps). The incoming ringing signal produces visual and audible signals. Guard circuits are provided in the ringer oscillator to reduce the probability of false operation from voice or noise.

(2) O*scillator circuit (transmitting)*. With ORDER WIRE switch S104 in the RING position, the output of the oscillator is applied through S104 to transmitting amplifier AR101. The signal is then amplified and applied to the JUNCTION PANEL (par. 16d).

C. Auxiliary Circuits (fig. 23).

(1) *Two-wire extension*. Hybrid coil T104 is connected to the receiving and transmitting circuits of the ORDER WIRE PANEL making it possible to talk and monitor over a two-wire circuit.

(2) *Communication over carrier channels*. With CHANNEL TALK switch S101 in the LINE position, handset HS101 can be used to communicate over any of the 12 channels by operating the TALK-MON switch of the desired channel (CHAN) to TALK.

(3) *Communication to local switchboard*. With CHANNEL TALK switch S101 in the TEST BD position, handset HS101 can be used to communicate with tile local switchboard attendant through the TALK-MON switch of the desired channel (CHAN).

19. Test Panel

(fig. 26)

The TEST PANEL contains circuits for making dc voltage measurements and selective and non selective signal frequency measurements at various points in the transmission circuits of Telephone

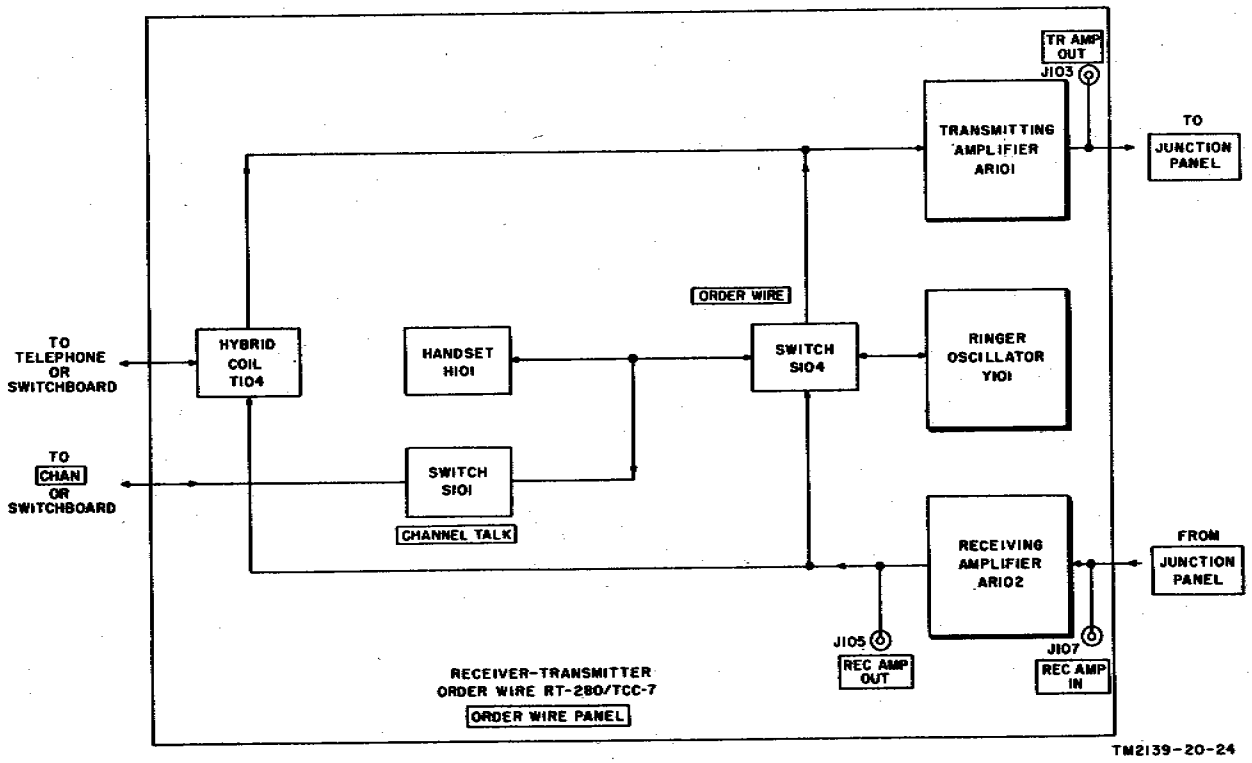


Figure 23. Receiver-Transmitter Order Wire RT-280/TCC-7, simplified block diagram.

Terminal AN/TCC-7. A measure cord and plug is provided to connect the circuit to be tested to the TEST PANEL meter circuit. These measurements are made without disturbing the operation of the system. The two test oscillators generate frequencies that are used for calibration of the selective measuring circuits, telephone system line-up, system modulation tests, and locating troubles.

a. Selective Measurements (fig. 24). Where one frequency among many must be chosen for test, and in an operating system where speech and other disturbances interfere with precise measurements, selective measurements are necessary. With MEASURE NON-SELECTIVE switch S4 in the OFF position and MEASURE SELECTIVE switch S3 in the operated position (other than OFF), signals from the test jacks are applied through the measure plug and cord, switch S4, and switch S3 to intermediate-frequency (IF) amplifier ART. A band-pass filter is inserted into the circuit to augment the selectivity of the amplifier circuits. The signal under test is amplified by IF amplifier ARI and applied to flat amplifier AR2. The test signal is further amplified by flat amplifier AR2 and, after being rectified, applied to meter M1.

b. Nonselective Measurements. When speech and other disturbances will not interfere with measurements, nonselective measurements are made. With MEASURE SELECTIVE switch S3 in the OFF position, and MEASURE NONSELECTIVE switch S4 in the operated position (other than OFF), signals from the test jacks are applied through the measure plug and cord and switch S4 to flat amplifier AR2. The signal under test is amplified by a fixed amount and, after being rectified, applied to meter M1.

20. Carrier Supply Panel

(fig. 26)

The modulator and demodulator circuits of Telephone Terminal AN/TCC-7 require several stable carrier-frequency signals for proper operation of the equipment. In addition, a pilot and two test frequencies are necessary for operation of the terminal. These frequencies are furnished by the CARRIER SUPPLY PANEL.

a. Carrier and Test Frequencies.

(1) Carrier frequencies of 8, 12, 16, and 20

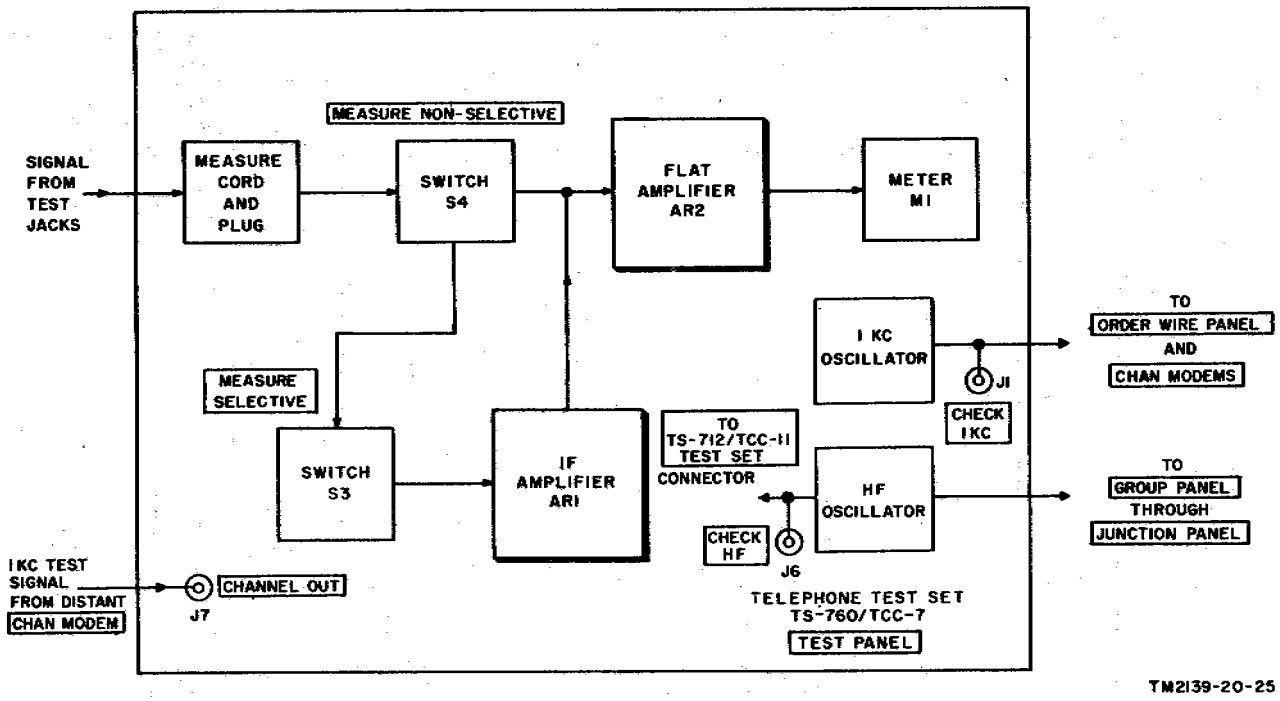


Figure 24 Telephone Test Set TS-760/TCC 7, simplified block diagram.

are supplied for the modulator and demodulator circuits of CHAN MODEMS 1, 2, and 3.

(2) Carrier frequencies of 56, 72, and 88 kc are supplied for the modulator and demodulator circuits of the SUBGROUP PANEL.

(3) A 120-kc carrier frequency is supplied for the modulator and demodulator circuits of the GROUP PANEL.

(4) A 68-kc pilot frequency is supplied for signal level regulation in the receiving circuits (par. 17b).

(5) Test frequencies of 12 and 28 kc are supplied for adjustment of the slope and bulge networks of the attended repeaters and remote terminal.

b. *Synchronization of Carrier Frequencies*. Frequency-shift distortion occurs when the carrier frequencies vf one Telephone Terminal AN/TCC-7 differ from those of the remote terminal equipment. To avoid the possibility of frequency-shift distortion, synchronizing circuits are included in the CARRIER SUPPLY PANEL to use the 68-kc pilot frequency received from the remote terminal as a synchronizing frequency for local equipment.

21. Power Supplies

(fig. 26)

a. *Power Supply PP-827/U*. The 200 VOLT POWER SUPPLY provides regulated dc plate and screen voltages and ac heater voltages for the following components of Telephone Terminal AN/TCC-7: CHAN MODEM. I, 2, and 3, SUBGROUP PANEL, GROUP PANEL, CARRIER SUPPLY PANEL, TEST PANEL, and ORDER WIRE PANEL. In addition) negative 10 volts is supplied for the ORDER WIRE PANEL handset transmitter and for bias in the 1,600 cps ringer-oscillator circuit of the ORDER WIRE PANEL. The input voltages for the 200 VOLT POWER SUPPLY may be 115 or 230 volts act

b. *Power Supply PP-826(*)1U*. The 600 VOLT POWER SUPPLY provides a regulated current of .1 ampere dc at a nominal 600 volts for one, two, or three Telephone Repeaters AN/TCC-11. Provisions are made through the use of dummy load resistors in the 600 VOLT POWER SUPPLY to compensate for a load when less than three repeaters are used. The output of the 600 VOLT POWER SUPPLY is applied through the JUNCTION PANEL (par. I 6d) to the nonloaded spiral-four cable

22. Repackaging for Shipment or Limited Storage

Note. For information pertaining to disassembly of Telephone Terminal AN/TCC-7, refer to TM 11-2139-10.

The exact procedure for repackaging depends on the material available and the conditions under which the equipment is to be shipped or stored. Adapt the procedure outlined below whenever possible. The information concerning the original packaging (TM 11-2139-10) will also be helpful.

a. Material Requirements. The following materials are required for packaging Telephone Terminal AN/TCC-7. For stock numbers of materials, consult SB 38-100.

Material	Quantity
Single-faced corrugated paper.....	300 sq. ft
Gummed paper tape.....	75 ft
Pressure-sensitive tape.....	85 ft
Steel strapping.....	80 ft
Waterproof barrier material.....	250 sq. ft
Wooden shipping boxes.....	9 ea

b. *Packaging*. Package the items of Telephone Terminal AN/TCC-7 as outlined below:

(1) *Technical manual*. Package each technical manual within a bag fabricated of waterproof barrier material. Seal the seams of the bag with pressure-sensitive tape.

(2) *Spare parts*. Package the spare parts individually within corrugated paper. Secure the wrapping with paper tape.

(3) *Stowage within transit case*. Stow the items packaged as specified in (2) above within the appropriate transit case.

(4) *Transit cases*. Cushion each transit case on all surfaces with pads fabricated of corrugated paper. Secure the cushioning material with paper tape.

c. *Packing*. Pack each Telephone Terminal AN/TCC-7 as outlined below:

(1) *Waterproof liner*. Line each wooden shipping box with waterproof barrier material. Seal all seams of the waterproof liner with pressure-sensitive tape.

(2) *Shipping boxes*. Place the packaged transit cases (b(4) above) within the wooden shipping boxes. Before sealing the top seam of the waterproof liner with pressure-sensitive tape, fill all voids with corrugated paper to prevent movement. Secure the packaged technical manual (b(1) above) between the contents and the lid of the box before nailing down the lid.

(3) *Strapping*. When packed for intertheater shipment, apply steel strapping girthwise to reinforce the shipping boxes.

(4) *Markings*. Mark each shipping box in accordance with the requirements of Military Standard, Marking for Shipment and Storage, MIL-STD-129A.

23. Authority for Demolition

Demolition of the equipment will be accomplished only upon the order of the commander. The destruction procedures outlined in paragraph 24 will be used to prevent further use of the equipment.

24. Methods of Destruction

a. *Smash*. Smash the controls, tubes, coils, switches, capacitors, transformers, and handset; use sledges, axes, hand-axes, hammers, or crowbars.

b. *Cut*. Cut cables and wiring; use axes, hand-axes, or machetes.

c. *Burn*. Burn cables, resistors, capacitors, coils, wiring, and technical manuals; use gasoline, kerosene, oil, flame throwers, or incendiary grenades.

d. *Bend*. Bend panels, transit cases, and chassis.

e. *Explode*. If explosives are necessary, use firearms, grenades, or TNT.

f. *Dispose*. Bury or scatter the destroyed parts in slit trenches, foxholes, or throw them into streams.

APPENDIX I
REFERENCES

Following is a list of references applicable and available to the organizational maintenance man of Telephone Terminal AN/TCC-7:

TM 11-381 Cable Assembly CX-1065/G, Telephone Cable Assemblies CX-1606/G and CX-1512/U, and Telephone Loading Coil Assembly CV-260/G.

TM 11-687 Radio Set AN/TRC-24, Radio Terminal Set AN/TRC-35, and Radio Relay Set AN/TRC-36.

TM 11-900 Power Units PE-75-C, -D, -J, -K, -P, -S, -T, -U, -W, -AA, -AB, -AC, AND -AE.

TM 11-900A Power Unit PE-75-AF.

TM 11-2140 Telephone Repeater AN/TCC-8 and Telephone Repeater AN/TCC-21.

TM 11-2143 Telephone Test Set TS-712/TCC-11.

TM 11-2148 Telephone Repeater AN/TCC-11.

TM 11-2150 Telephone Carrier Systems Using Telephone Terminal AN/TCC-7, Telephone Repeater AN/TCC-8 (AN/TCC-21), Telephone Repeater AN/TCC-11, and Telephone Test Set TS-712/TCC-11.

[AG 413.42 (13 Dec 57)]

APPENDIX II
MAINTENANCE ALLOCATION CHART
FOR
TERMINAL, TELEPHONE AN/TCC-7

Section I. PREFACE

1. General

a. The maintenance allocation portion of the Technical Manual assigns maintenance functions and repair operations to be performed by the lowest appropriate maintenance echelon.

b. The lists in Section II are presented in columns titled as follows:

(1) PART OR COMPONENT. Only the nomenclature or standard item name is annotated in this column. Additional descriptive data is included only where clarification is necessary to identify the part. Components and parts comprising a major end item are listed alphabetically. Assemblies and sub-assemblies are in alphabetical sequence with their components listed alphabetically immediately below the assembly listing.

(2) RELATED OPERATION. This column indicates the various maintenance functions allocated to the echelon capable of performing the operation. These are defined as follows:

(a) Service. To clean, to preserve, and to replenish fuel and lubricants.

(b) Adjust. To regulate periodically to prevent malfunction.

(c) Inspect. To verify serviceability and to detect incipient electrical or mechanical failure by scrutiny.

(d) Test. To verify serviceability and to detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, etc.

(e) Replace. To substitute serviceable assemblies, sub-assemblies, and parts for unserviceable components.

(f) Repair. To restore to a serviceable condition by replacing unserviceable parts or by any other action required utilizing tools, equipment and skills available, to include welding, grinding, riveting, straightening, adjusting, etc.

(g) Align. To adjust two or more components of an electrical system so that their functions are properly synchronized.

(h) Calibrate. To determine, check, or rectify the graduation of an instrument, weapon, or weapons system, or components of a weapons system.

(i) Rebuild. To restore to a condition comparable to new by disassembling the item to determine the condition of each of its component parts and reassembling it using serviceable, rebuilt, or new assemblies, subassemblies, and parts.

(3) ECHELON ALLOCATED THE MAINTENANCE OPERATION. The symbol "X" placed in the appropriate column indicates the echelon responsible for performing that particular maintenance operation, but does not necessarily indicate that repair parts will be stocked at that level. Echelons higher than the echelon marked by "X" are authorized to perform the indicated operation.

(4) REPAIR FACILITIES CODE. Code numbers are assigned to each individual tool equipment, test equipment and maintenance equipment referenced under "Inclosure To The Maintenance Allocation Chart". The grouping of codes in the Repair Facilities Code Column of the Maintenance Allocation Chart indicates the tool, test and maintenance equipment required to perform the maintenance operation.

(5) REMARKS. Entries in this column will be utilized when necessary to clarify any of the data cited in the proceeding columns.

(6) ENCLOSURE TO THE MAINTENANCE ALLOCATION CHART.

(a) FACILITIES REQUIRED FOR MAINTENANCE OPERATIONS. Tools, test and maintenance equipment required to perform the maintenance functions are listed in this column and coded in the Repair Facilities Code column.

(b) ECHELON ALLOCATED THE FACILITY. The symbol "+" placed in the appropriate columns indicates the echelons allocated the facility.

2. Contents of the Maintenance Allocation Chart

The major items of TERMINAL, TELEPHONE AN/TCC-7 appear in the Maintenance Allocation Chart (Section II below) in the following sequence:

Terminal, Telephone AN/TCC-7
- Amplifier-Pilot Regulator AM-707/TCC-7
- Modem, Telephone TA-219/U
- Modem, Telephone TA-227/U
- Power Supply PP-826/U, PP-826A/U
- Power Supply PP-827/U
- Receiver-Transmitter Test Set OA-443/TCC--7
- Receiver-Transmitter, Order Wire RT-280/TCC-7
- Test Set, Telephone TS-760/TCC-7
- Telephone Carrier Frequency Supply TA-228/TCC-7

3. Comments or Suggestions

Any comments concerning omissions and discrepancies in this appendix will be prepared on DA Form 2028 in accordance with Department of the Army Circular 310-16 and forwarded directly to Commanding Officer, U. S. Army Signal Equipment Support Agency, Fort Monmouth, New Jersey, Attn: SIGFM/ES-ML.

APPENDIX II
MAINTENANCE ALLOCATION CHART, PART II, SECTION II

PART OR COMPONENT	RELATED OPERATION	ECHELON ALLOCATED THE MAINTENANCE OPERATION						REPAIR FACILITIES CODE	REFERENCE
		OPERATOR	ORGANIZATIONAL		FIELD		DEPOT		
		FIRST	SECOND ECHELON		THIRD	FOURTH	FIFTH		
		ECHELON	TACTICAL	FIXED	ECHELON	ECHELON	ECHELON		
TERMINAL TELEPHONE AN/TCC-7									
	replace	X							
	repair				X				
	rebuild						X		
	service	X							
	inspect	X							External Parts
	inspect		X					11	Interior Parts
	adjust		X					11	Perform initial adjustments and tests, system line up procedure using built-in test equipment.
	adjust				X			1, 2, 4, 5	All adjustments
	test		X					1, 2, 3	Perform initial adjustments and tests, system line up procedure using built-in test equipment Perform tests of signal levels, carrier and test frequency levels using built in test equipment. Perform resistance, voltage and current measurements to determine condition of circuits.

APPENDIX II
MAINTENANCE ALLOCATION CHART, PART II, SECTION II

PART OR COMPONENT	RELATED OPERATION	ECHELON ALLOCATED THE MAINTENANCE OPERATION						REPAIR FACILITIES CODE	REFERENCE
		OPERATOR	ORGANIZATIONAL		FIELD		DEPOT		
		FIRST ECHELON	SECOND ECHELON		THIRD ECHELON	FOURTH ECHELON	FIFTH ECHELON		
			TACTICAL	FIXED					
TERMINAL TELEPHONE AN/TCC-7									
	test						X	12	
	test				X			1, 2, 4, 5	Make gain measurements. Test output level of carrier frequency supplies and test oscillators.
	test				x			1 thru 11	All testing
	align					x		6, 7, 8, 9	Oscillator Circuits
AMPLIFIER-PILOT REGULATOR AN-707/TCC-7									
	replace	X							
	repair				X				
	rebuild						X		
	service	X							
	inspect	X							External Parts
	inspect		X						Interior Parts
	test		X					1, 2, 3, 10	Perform tests of signal levels, carrier and test frequency levels using built in test equipment. Perform resistance, voltage and current measurements to determine condition of circuits.
	test						X	12	
	test				X			4, 5	Make gain measurements.

APPENDIX II
MAINTENANCE ALLOCATION CHART, PART II, SECTION II

		ECHELON ALLOCATED THE MAINTENANCE OPERATION							

PART OR COMPONENT	RELATED OPERATION	OPERATOR	ORGANIZATIONAL		FIELD		DEPOT	REPAIR FACILITIES CODE	REFERENCE
		FIRST ECHELON	SECOND ECHELON		THIRD ECHELON	FOURTH ECHELON	FIFTH ECHELON		
			TACTICAL	FIXED					
TERMINAL TELEPHONE AN/TCC-7 CONT									
	test					X		1 thru 10	All testing
	adjust		X					1,2,4,5	Perform initial adjustments and tests, system line up procedure using built-in test equipment.
	adjust				X			1, 2, 4, 5	All Adjustments
MODEM, TELEPHONE TA-219/U									
	replace	X							
	repair				X				
	rebuild						X		
	service	X							
	adjust	X							Adjust receiving amplifier gain when required to keep circuits in traffic.
	Adjust		X						Perform initial adjustments and tests, system line up procedure using built-in test equipment.
	adjust				X			1, 2, 4, 5	All Adjustments
	inspect	X							External Parts
	inspect		X						Interior Parts

APPENDIX II
MAINTENANCE ALLOCATION CHART, PART II, SECTION II

PART OR COMPONENT	RELATED OPERATION	ECHELON ALLOCATED THE MAINTENANCE OPERATION						REPAIR FACILITIES CODE	REFERENCE
		OPERATOR	ORGANIZATIONAL		FIELD		DEPOT		
		FIRST ECHELON	SECOND ECHELON		THIRD ECHELON	FOURTH ECHELON	FIFTH ECHELON		
			TACTICAL	FIXED					
AN/TCC-7 (continued)									
	test		X					1, 2, 3, 10	Perform tests of signal levels, carrier and test frequency levels using built in test equipment. Perform resistance, voltage and current measurements to determine condition of circuits.
	test						X	12	
	test				X			4, 5	Make gain measurements.
	test					X		1 thru 9	All testing
MODEM, TELEPHONE TA-227/U									
	replace	X							
	repair				X				
	rebuild						X		
	service	X							
	adjust		X						Perform initial adjustments and tests, system line up procedure using built-in test equipment.
	adjust				X			1, 2, 4, 5	All Adjustments
	inspect	X							External Parts
	inspect		X						Interior Parts

APPENDIX II
MAINTENANCE ALLOCATION CHART, PART II, SECTION II

PART OR COMPONENT	RELATED OPERATION	ECHELON ALLOCATED THE MAINTENANCE OPERATION						REPAIR FACILITIES CODE	REFERENCE
		OPERATOR	ORGANIZATIONAL		FIELD		DEPOT		
		FIRST	SECOND ECHELON		THIRD	FOURTH	FIFTH		
		ECHELON	TACTICAL	FIXED	ECHELON	ECHELON	ECHELON		
AN/TCC-7 (continued)									
	test		X					1, 2, 3, 10	Perform tests of signal levels, carrier and test frequency levels using built in test equipment. Perform resistance, voltage and current measurements to determine condition of circuits.
	test						X	12	
	test				X			4, 5	Make gain measurements.
	test					X		1 thru 9	All testing
POWER SUPPLY PP-826/U; PP-826A/U									
	replace	X							
	repair				X				
	rebuild						X		
	service	X							
	adjust	X						11	600 volt adjustments only.
	adjust		X					11	All Adjustments
	inspect	X							External Parts
	inspect		X						Interior Parts
	test	X							Test load current and DC output voltage using built-in test equipment.

APPENDIX II
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PART OR COMPONENT	RELATED OPERATION	ECHELON ALLOCATED THE MAINTENANCE OPERATION						REPAIR FACILITIES CODE	REFERENCE
		OPERATOR	ORGANIZATIONAL		FIELD		DEPOT		
		FIRST ECHELON	SECOND ECHELON		THIRD ECHELON	FOURTH ECHELON	FIFTH ECHELON		
			TACTICAL	FIXED					
AN/TCC-7 (continued)									
	test		X					1, 2, 3	Perform resistance, voltage and current measurements to determine condition of circuits.
	test						X	12	
	test				X			1, 2, 3	All testing
POWER SUPPLY PP-827/U									
	replace	X							
	repair				X				
	rebuild						X		
	service	X							
	adjust	X							
	inspect	X							External Parts
	inspect		X						Interior Parts
	test	X							Test 200v DC output using built-in test equipment.
	test		X					1, 2, 3	Perform resistance, voltage and current measurements to determine condition of circuits.
	test						X	12	
	test				X			1, 2, 3	All testing

APPENDIX II
MAINTENANCE ALLOCATION CHART, PART II, SECTION II

PART OR COMPONENT	RELATED OPERATION	ECHELON ALLOCATED THE MAINTENANCE OPERATION						REPAIR FACILITIES CODE	REFERENCE
		OPERATOR	ORGANIZATIONAL		FIELD		DEPOT		
		FIRST ECHELON	SECOND ECHELON		THIRD ECHELON	FOURTH ECHELON	FIFTH ECHELON		
			TACTICAL	FIXED					
AN/TCC-7 (continued)									
RECEIVER-TRANSMITTER-TEST SET GROUP OA-443/TCC-7									
	replace	X							
	repair				X				
	rebuild						X		
	service	X							
	adjust		X						Perform initial adjustments and tests, system line up procedure using built-in test equipment
	adjust				X			1, 2, 4, 5	All Adjustments
	inspect	X							External Parts
	inspect		X						Interior Parts
	test		X					1, 2, 3, 10	Perform tests of signal levels, carrier and test frequency levels using built in test equipment. Perform resistance, voltage and current measurements to determine condition of circuits.
	test						X	12	
	test				X			1, 2, 4, 5	Make gain measurements. Test output level of carrier frequency supplies and test oscillators.
	test					X		1 thru 9	All testing
	calibrate					X		6, 7, 8, 9	Oscillator Circuits

APPENDIX II

MAINTENANCE ALLOCATION CHART, PART II, SECTION II

PART OR COMPONENT	RELATED OPERATION	ECHELON ALLOCATED THE MAINTENANCE OPERATION						REPAIR FACILITIES CODE	REFERENCE
		OPERATOR	ORGANIZATIONAL		FIELD		DEPOT		
		FIRST ECHELON	SECOND ECHELON		THIRD ECHELON	FOURTH ECHELON	FIFTH ECHELON		
			TACTICAL	FIXED					
AN/TCC-7 (continued) TELEPHONE CARRIER FREQUENCY SUPPLY TA-228/TCC-7									
	replace	X							
	repair				X				
	rebuild						X		
	service	X							
	service	X							
	adjust		X						Perform initial adjustments and tests, system line up procedure using built-in test equipment
	adjust				X			1, 2, 4, 5	All Adjustments
	inspect	X							External Parts
	inspect		X						Interior Parts
	test		X					1, 2, 3, 10	Perform tests of signal levels, carrier and test frequency levels using built in test equipment. Perform resistance, voltage and current measurements to determine condition of circuits.
	test						X	12	
	test				X			1, 2, 4, 5	Make gain measurements. Test output level of carrier frequency sup-plies and test oscillators.

APPENDIX II
MAINTENANCE ALLOCATION CHART, PART II, SECTION II

PART OR COMPONENT	RELATED OPERATION	ECHELON ALLOCATED THE MAINTENANCE OPERATION						REPAIR FACILITIES CODE	REFERENCE
		OPERATOR	ORGANIZATIONAL		FIELD		DEPOT		
		FIRST ECHELON	SECOND ECHELON		THIRD ECHELON	FOURTH ECHELON	FIFTH ECHELON		
			TACTICAL	FIXED					
AN/TCC-7 (continued)									
	test					X		1 thru 9	All testing.
	calibrate					X		6, 7, 8, 9	Oscillator Circuits
AMPLIFIER-PILOT REGULATOR AM-707/TCC-7									
AMPLIFIERS	replace		X	X					
	repair						X		
	rebuild						X		
ARRESTORS, LIGHTNING	replace	X							
BUZZER	replace			X					
	repair				X				
CABLE, SPECIAL PURPOSE	replace			X					
CAPACITORS	replace			X					
CATCH, LUGGAGE	replace				X				
COILS	replace			X					
CONNECTORS	replace			X					
ELECTRON TUBES	replace	X							
EQUALIZER, TELEPHONE LINE	replace			X					
FILTERS	replace			X					
HOLDER, HANDSET	replace		X	X					
HOLDER, LIGHTNING ARRESTOR	replace		X	X					
JACK, TELEPHONE	replace		X	X					
KNOB	replace		X	X					
LAMP, INCANDESCENT	replace	X							
LENS, INDICATOR LIGHTS	replace		X	X					
LIGHT, INDICATOR	replace		X	X					
NETWORKS	replace			X					
PACKING, MATERIAL	replace					X			
POST, BINDING	replace				X				
RECTIFIER, METALLIC	replace			X					
RELAY, ARMATURE	replace			X					
RESISTORS	replace			X					

APPENDIX II
MAINTENANCE ALLOCATION CHART, PART II, SECTION II

PART OR COMPONENT	RELATED OPERATION	ECHELON ALLOCATED THE MAINTENANCE OPERATION						REPAIR FACILITIES	REFERENCE
		OPERATOR	ORGANIZATIONAL		FIELD		DEPOT		
		FIRST	SECOND ECHELON		THIRD	FOURTH	FIFTH		
		ECHELON	TACTICAL	FIXED	ECHELON	ECHELON	ECHELON	CODE	
AN/TCC-7 (continued)									
SCREW, EXTERNALLY RELIEVED BODY	replace		X	X					
SHIELD, ELECTRON TUBE	replace		X	X					
SOCKET, ELECTRON TUBE	replace			X					
STRAP, CARRYING	replace		X	X					
SPRING ASSEMBLY	replace		X	X					
SWITCHES	replace			X					
TERMINAL, STUD	replace			X					
TRANSFORMER	replace			X					
MODEM, TELEPHONE TA-219/U									
CAPACITORS	replace			X					
CATCH, LUGGAGE	replace				X				
CONNECTORS	replace			X					
ELECTRON TUBES	replace	X							
FILTER	replace			X					
KNOB	replace		X	X					
MODULATOR SUB-ASSEMBLY	replace		X	X					
	repair				X				
	rebuild						X		
PACKING, PERFORMED	replace					X			
POST, BINDING	replace				X				
RECTIFIER, METALLIC	replace			X					
RESISTORS	replace			X					
RETAINER, CATCH	replace				X				
SCREW	replace		X	X					
SHIELD, ELECTRON TUBE	replace		X	X					
SLING, CARRYING, BAG AND CASE	replace		X	X					
SPRING ASSEMBLY	replace				X				
SOCKET, ELECTRON TUBE	replace			X					
SWITCH, LEVER	replace			X					
TERMINAL, STUD	replace			X					
TRANSFORMER, AUDIO FREQUENCY	replace			X					
MODEM, TELEPHONE TA-219/U									
CABLE, SPECIAL PURPOSE	replace			X					
CAPACITORS	replace			X					
CATCH, LUGGAGE	replace				X				
COILS, TELEPHONE RETARDATION	replace			X					

APPENDIX II
MAINTENANCE ALLOCATION CHART, PART II, SECTION II

PART OR COMPONENT	RELATED OPERATION	ECHELON ALLOCATED THE MAINTENANCE OPERATION						REPAIR FACILITIES CODE	REFERENCE
		OPERATOR	ORGANIZATIONAL		FIELD		DEPOT		
		FIRST	SECOND ECHELON		THIRD	FOURTH	FIFTH		
		ECHELON	TACTICAL	FIXED	ECHELON	ECHELON	ECHELON		
AN/TCC-7 (continued)									
CONNECTORS	replace				X				
ELECTRON TUBE	replace	X							
FILTER	replace			X					
JACK, TELEPHONE	replace		X	X					
LAMP, INCANDESCENT	replace	X							
LENS, INDICATOR LIGHT	replace		X	X					
LIGHT, INDICATOR	replace		X	X					
PACKING, MATERIAL	replace					X			
POST, BINDING	replace				X				
RECTIFIER, METALLIC	replace			X					
RESISTORS	replace			X					
SCREW, EXTERNALLY RELIEVED BODY	replace		X	X					
SHIELD	replace		X	X					
SOCKET, ELECTRON TUBE	replace			X					
SPRING ASSEMBLY	replace		X	X					
STRAP, CARRYING	replace		X	X					
SWITCH, LEVER PILE-UP	replace			X					
TERMINAL, STUD	replace			X					
TRANSFORMER	replace			X					
POWER SUPPLY PP-826/U; PP-826A/U									
CATCH, LUGGAGE	replace					X			
PACKING, MATERIAL	replace					X			
STRAP, CARRYING	replace		X	X					
600 VOLT POWER SUPPLY GROUP									
AM METER	replace			X					
	repair					X			
BEARING, SLEEVE	replace					X			
BUZZER	replace			X					
	repair					X			
CABLE	replace			X					
	repair			X					
CAPACITORS	replace			X					
CLIP, ELECTRICAL	replace			X					
CONNECTORS	replace			X					
ELECTRON TUBE	replace	X							
FAN	replace			X					
	repair					X			
FASTENER, SPRING LOCK	replace					X			

APPENDIX II
MAINTENANCE ALLOCATION CHART, PART II, SECTION II

PART OR COMPONENT	RELATED OPERATION	ECHELON ALLOCATED THE MAINTENANCE OPERATION						REPAIR FACILITIES CODE	REFERENCE
		OPERATOR	ORGANIZATIONAL		FIELD		DEPOT		
		FIRST	SECOND ECHELON		THIRD	FOURTH	FIFTH		
		ECHELON	TACTICAL	FIXED	ECHELON	ECHELON	ECHELON		
AN/TCC-7 (continued)									
FUSE, CARTRIDGE	replace	X							
FUSEHOLDER	replace			X					
GASKET	replace					X			
GUARD	replace			X					
HOLDER, SPRING	replace					X			
INSULATORS	replace			X					
JACK, TIP	replace			X					
KNOB	replace		X	X					
LAMP, INCANDESCENT	replace	X							
LENS, INDICATOR LIGHT	replace		X	X					
LIGHT, INDICATOR	replace			X					
REACTOR	replace			X					
RESISTORS	replace			X					
RETAINER, ELECTRON TUBE	replace		X	X					
SCREW, EXTERNALLY RELIEVED BODY	replace		X	X					
SHIELD, ELECTRON TUBE	replace		X	X					
SOCKET, ELECTRON TUBE	replace			X					
SPRING ASSEMBLY	replace					X			
SWITCHES	replace			X					
TERMINAL LUG	replace			X					
TRANSFORMER, POWER	replace			X					
LOW VOLTAGE RECTIFIER AND ALARM UNIT GROUP									
CAPACITORS	replace			X					
CONNECTORS	replace		X	X					
ELECTRON TUBE	replace	X							
JACK, TIP	replace		X	X					
REACTOR	replace			X					
RECTIFIER, METALLIC	replace			X					
RESISTORS	replace			X					
SOCKET, ELECTRON TUBE	replace			X					
TRANSFORMER, POWER	replace			X					
POWER SUPPLY PP-827/U									
CABLE, POWER	replace		X	X					
CABLE, SPECIAL PURPOSE	replace			X					
CAPACITORS	replace			X					
CONNECTOR, PLUG	replace		X	X					

APPENDIX II
MAINTENANCE ALLOCATION CHART, PART II, SECTION II

PART OR COMPONENT	RELATED OPERATION	ECHELON ALLOCATED THE MAINTENANCE OPERATION						REPAIR FACILITIES CODE	REFERENCE
		OPERATOR	ORGANIZATIONAL		FIELD		DEPOT		
		FIRST	SECOND ECHELON		THIRD	FOURTH	FIFTH		
		ECHELON	TACTICAL	FIXED	ECHELON	ECHELON	ECHELON		
AN/TCC-7 (continued)									
CONNECTOR, PLUG: J1 thru J22	replace			X					
ELECTRON TUBE	replace	X							
FAN: B1	replace			X					
	repair					X			
FASTENER, SPRING LOCK	replace					X			
FUSE, CARTRIDGE	replace	X							
FUSEHOLDER	replace			X					
GASKET	replace					X			
HOLDER, SPRING	replace					X			
INSULATOR, WASHER	replace			X					
LAMP, INCANDESCENT	replace	X							
LENS, INDICATOR LIGHT	replace		X	X					
LIGHT, INDICATOR	replace			X					
PACKING MATERIAL	replace					X			
REACTOR	replace			X					
RECTIFIER	replace			X					
RESISTORS	replace			X					
RETAINER, ELECTRON TUBE	replace		X	X					
SCREW	replace		X	X					
SHIELD, ELECTRON TUBE	replace		X	X					
SOCKET, ELECTRON TUBE	replace			X					
SPRING	replace					X			
STRAP, ASSEMBLY	replace		X	X					
STRAP, CARRYING	replace		X	X					
STUD, THREADED	replace		X	X					
SWITCHES	replace			X					
TERMINAL, STUD	replace			X					
TRANSFORMER	replace			X					
WASHER, EXTRUDED	replace		X	X					
RECEIVER-TRANSMITTER TEST SET GROUP OA-443/TCC-7									
CATCH, LUGGAGE	replace					X			
PACKING, PREFORMED	replace					X			
RECEIVER-TRANSMITTER, ORDERWIRE RT-280/TCC-7	replace repair	X			X				
	rebuild						X		
SPRING ASSEMBLY	replace					X			

APPENDIX II
MAINTENANCE ALLOCATION CHART, PART II, SECTION II

PART OR COMPONENT	RELATED OPERATION	ECHELON ALLOCATED THE MAINTENANCE OPERATION						REPAIR FACILITIES CODE	REFERENCE
		OPERATOR	ORGANIZATIONAL		FIELD		DEPOT		
		FIRST	SECOND ECHELON		THIRD	FOURTH	FIFTH		
		ECHELON	TACTICAL	FIXED	ECHELON	ECHELON	ECHELON		
AN/TCC-7 (continued)									
TEST SET, TELEPHONE TS 760/TCC-7	replace	X							
	repair				X				
	rebuild						X		
RECEIVER-TRANSMITTER, ORDERWIRE RT-280/TCC-7									
AMPLIFIERS	replace		X	X					
	repair				X				
	rebuild						X		
BUZZER	replace			X					
	repair				X				
CAPACITORS	replace			X					
CONNECTORS	replace			X					
CRYSTAL UNIT, RECTIFYING	replace			X					
ELECTRON TUBE	replace	X							
EQUALIZER, TELEPHONE	replace			X					
FILTER, LOW PASS	replace			X					
HANDSET TS-9-F	replace	X							
	repair				X				
	rebuild						X		
JACK, TELEPHONE	replace		X	X					
KNOB	replace		X	X					
LAMP, INCANDESCENT	replace	X							
LENS, INDICATOR LIGHT	replace		X	X					
LIGHT, INDICATOR	replace		X	X					
POST, BINDING	replace				X				
REACTOR	replace			X					
RELAY, ARMATURE	replace			X					
RESISTORS	replace			X					
RINGER, OSCILLATOR	replace		X	X					
	repair				X				
	rebuild						X		
SCREW	replace		X	X					
SHIELD, ELECTRON TUBE	replace		X	X					
SOCKET, ELECTRON TUBE	replace			X					
SWITCHES	replace			X					
TERMINAL, STUD	replace			X					
TRANSFORMER, AUDIO FREQUENCY	replace			X					

APPENDIX II
MAINTENANCE ALLOCATION CHART, PART II SECTION II

PART OR COMPONENT	RELATED OPERATION	ECHELON ALLOCATED THE MAINTENANCE OPERATION					REPAIR FACILITIES CODE	REFERENCE
		OPERATOR	ORGANIZATIONAL	FIELD		DEPOT		
		FIRST ECHELON	SECOND ECHELON TACTICAL	THIRD ECHELON FIXED	FOURTH ECHELON	FIFTH ECHELON		
AN/TCC-7 (continued)								
TEST SET TELEPHONE TS-760/TCC-7								
CABLE, SPECIAL PURPOSE	replace		X	X				
CAPACITORS	replace			X				
CONNECTORS	replace			X				
COIL TELEPHONE RETARDATION	replace			X				
ELECTRON TUBE	replace			X				
FILTERS	replace			X				
JACK, TELEPHONE	replace			X				
KNOB	replace		X	X				
LAMP, INCANDESCENT	replace	X						
LENS, INDICATOR LIGHT	replace		X	X				
LIGHT, INDICATOR	replace		X	X				
METER, AUDIO LEVEL	replace			X				
	repair					X		
PLUG, TELEPHONE	replace		X	X				
RECTIFIER, METALLIC	replace			X				
RESISTORS	replace			X				
SCREW, ETERNALLY RELIEVED BODY	replace		X	X				
SHIELD, ELECTRON TUBE	replace		X	X				
SOCKET, ELECTRON TUBE	replace			X				
SWITCH	replace			X				
TERMINAL, STUD	replace			X				
TEST SET SUB-ASSEMBLY	replace		X	X				
	repair				X			
	rebuild							X
TRANSFORMER, AUDIO FREQUENCY	replace			X				
WIRE, ELECTRICAL	replace			X				
TELEPHONE CARRIER FREQUENCY SUPPLY TA- 228/TCC-7								
CABLE, SPECIAL PURPOSE	replace			X				
CAPACITORS	replace			X				

APPENDIX II
MAINTENANCE ALLOCATION CHART, PART II SECTION II

PART OR COMPONENT	RELATED OPERATION	ECHELON ALLOCATED THE MAINTENANCE OPERATION					REPAIR FACILITIES CODE	REFERENCE
		OPERATOR	ORGANIZATIONAL	FIELD		DEPOT		
		FIRST ECHELON	SECOND ECHELON TACTICAL	THIRD ECHELON FIXED	FOURTH ECHELON	FIFTH ECHELON		
AN/TCC-7 continued	replace							
CLIP, ELECTRICAL	replace		X	X				
COIL, TELEPHONE	replace			X				
CONNECTORS	replace			X				
CRYSTAL UNIT, RECTIFYING	replace			X				
ELECTRON TUBE	replace	X						
FILTER, BAND-PASS	replace			X				
JACK, TELEPHONE	replace			X				
LAMP, INCANDESCENT	replace	X						
LENS, INDICATOR LIGHT	replace		X	X				
LIGHT, INDICATOR	replace			X				
NETWORK. FREQUENCY STABILIZING	replace		X	X				
	repair				X			
	rebuild						x	
PACKING, MATERIAL	replace					X		
PROD, TEST	replace							
RECTIFIER, METALLIC	replace			X				
RELAY, ARMATURE	replace			X				
RESISTORS	replace			X				
SCREW, EXTERNALLY RELIEVED BODY	replace		X	X				
SHIELD, ELECTRON TUBE	replace		X	X				
SOCKET, ELECTRON TUBE	replace			X				
SPRING ASSEMBLY	replace					X		
STRAP, CARRYING	replace		X	X				
SWITCH, LEVER, PILE UP	replace			X				
TERMINAL, STUD	replace			X				
TRANSFORMER, AUDIO FREQUENCY	replace			X				

APPENDIX II
INCLOSURE TO THE
MAINTENANCE ALLOCATION CHART, PART II, SECTION II

FACILITIES REQUIRRED FOR MAINTENANCE OPERATIONS	ECHELON ALLOCATED THE FACILITY						REPAIR FACILITIES CODE	REFERENCE
	OPERATOR	ORGANIZATIONAL		FIELD		DEPOT		
	FIRST ECHELON	SECOND ECHELON		THIRD ECHELON	FOURTH ECHELON	FIFTH ECHELON		
		TACTICAL	FIXED					
AN/TCC-7 (continued)								
MULTIMETER ME-77/U		†						
SHUNT, INSTRUMENT, MULTI-RANGE MX-1471/U		†						
TEST SET ELECTRON TUBE TV-7/U								
SIGNAL GENERATOR SG - 71/FCC								
AUDIO LEVEL METER -71/FCC								
VOLTMETER METER ME-30/U								
FREQUENCY METER AN/USM-26								
ATTENUATOR TS-402/U								
CARRIER TEST FACILTIES KIT MK-155/TCC								
TEST SET TS-190/U		†						
TOOL. EQUIPMENT TE-123		†						
TEST SET, ELECTRON TUBE TV-2/U								

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NG: State AG; units-same as Active Army.
USAR: None.
For explanation of abbreviations used, see AR 320-50.

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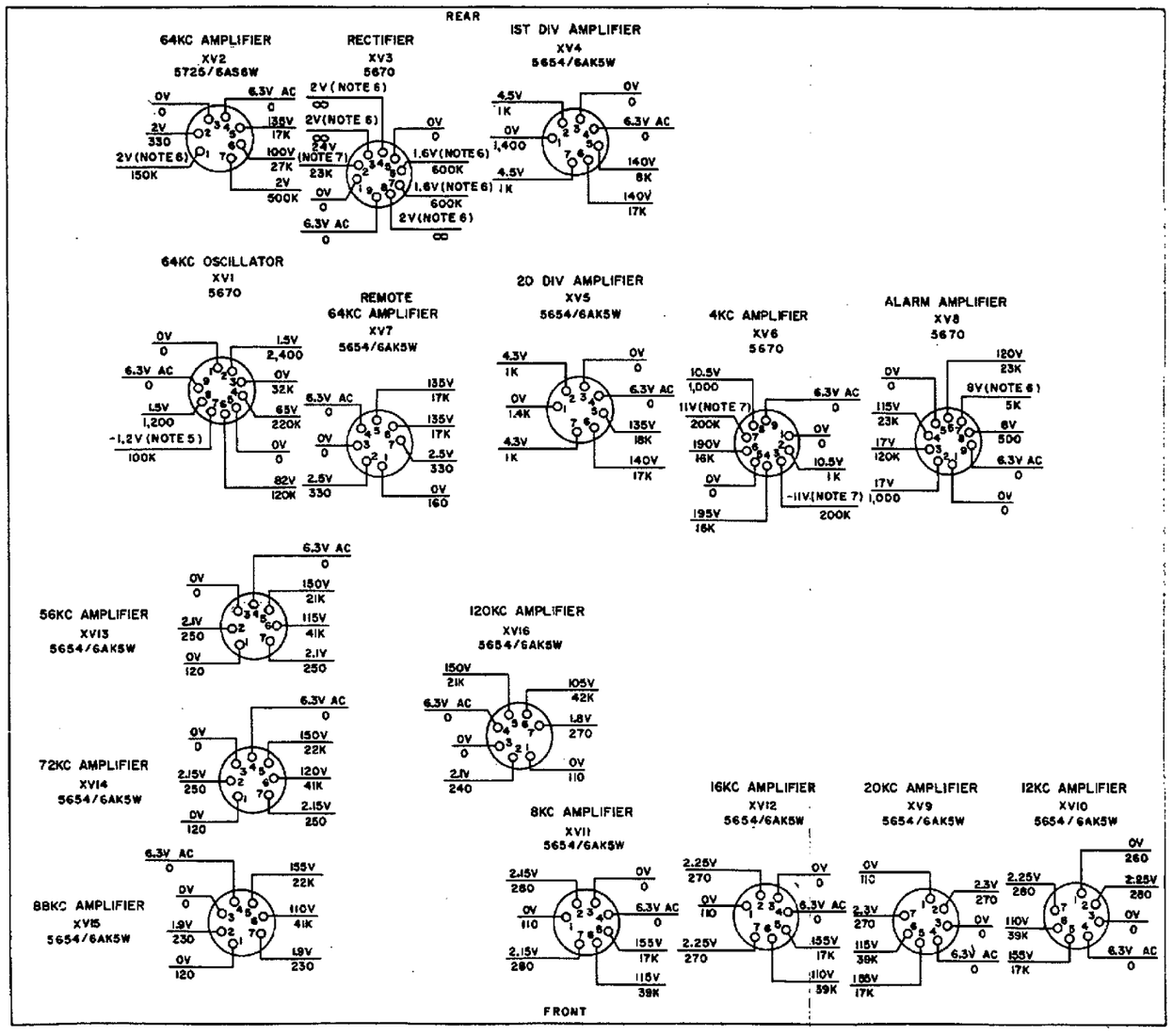

NOTES:

1. DO NOT ATTEMPT TO MAKE RESISTANCE MEASUREMENTS WITH POWER ON.
2. VOLTAGE MEASUREMENTS ARE SHOWN ABOVE LINE, RESISTANCE MEASUREMENTS BELOW.
3. DC VOLTAGE MEASUREMENTS ARE TAKEN WITH A 20,000-OHMS-PER-VOLT METER.
4. ALL MEASUREMENTS ARE MADE FROM TEST POINT TO GROUND (CHASSIS).
5. METER RANGE OF 2.5V TO BE USED FOR THIS MEASUREMENT.
6. METER RANGE OF 10V TO BE USED FOR THIS MEASUREMENT.
7. METER RANGE OF 50V TO BE USED FOR THIS MEASUREMENT.
8. UNLESS OTHERWISE SHOWN, VOLTAGES ARE DC.

TM2139-20-14

Figure 11. Telephone Carrier Frequency Supply TA-228/TCC-7, tube socket voltage and resistance diagram.

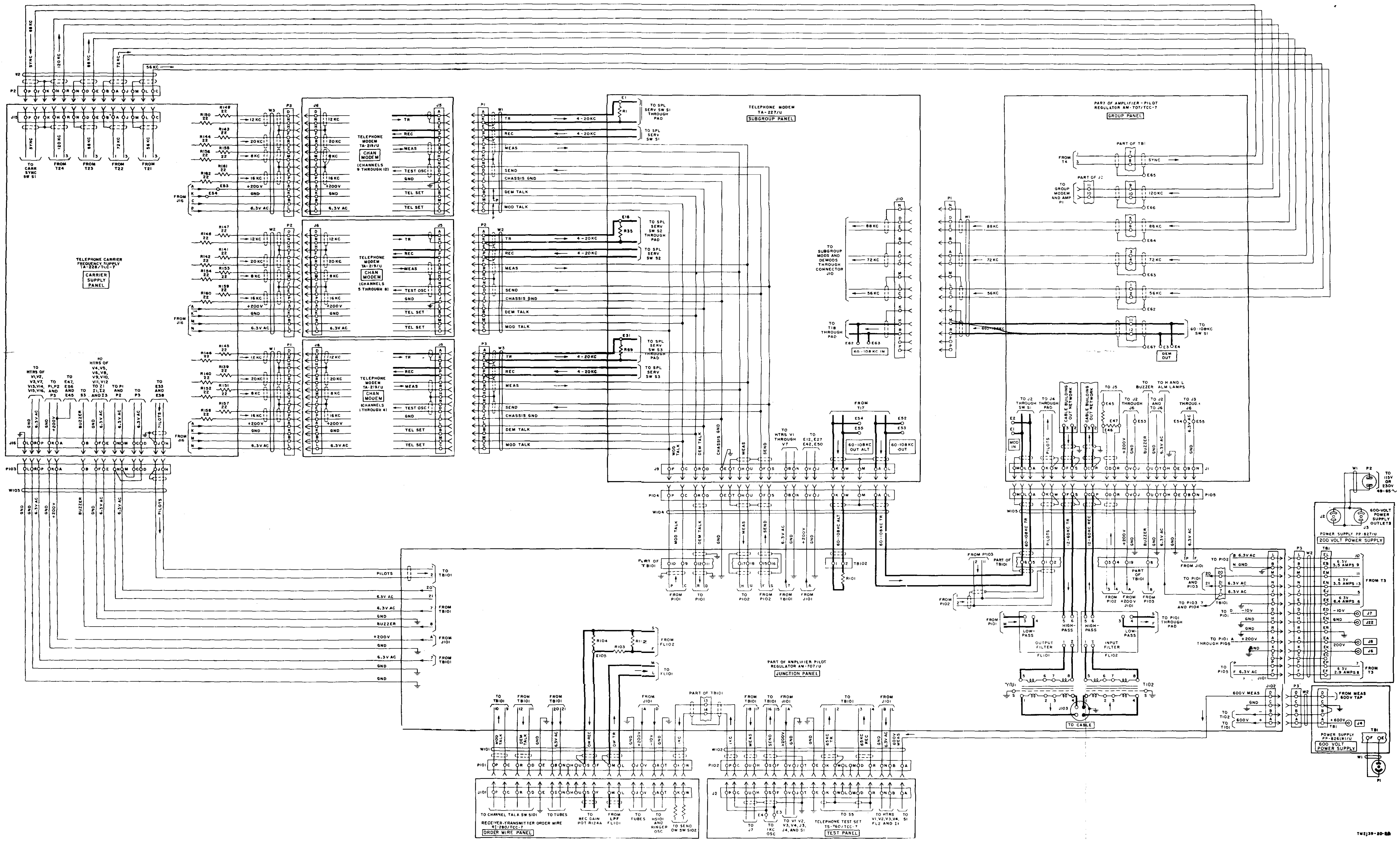

Figure 25. Telephone Terminal AN/TCC-7, interpanel cabling diagram

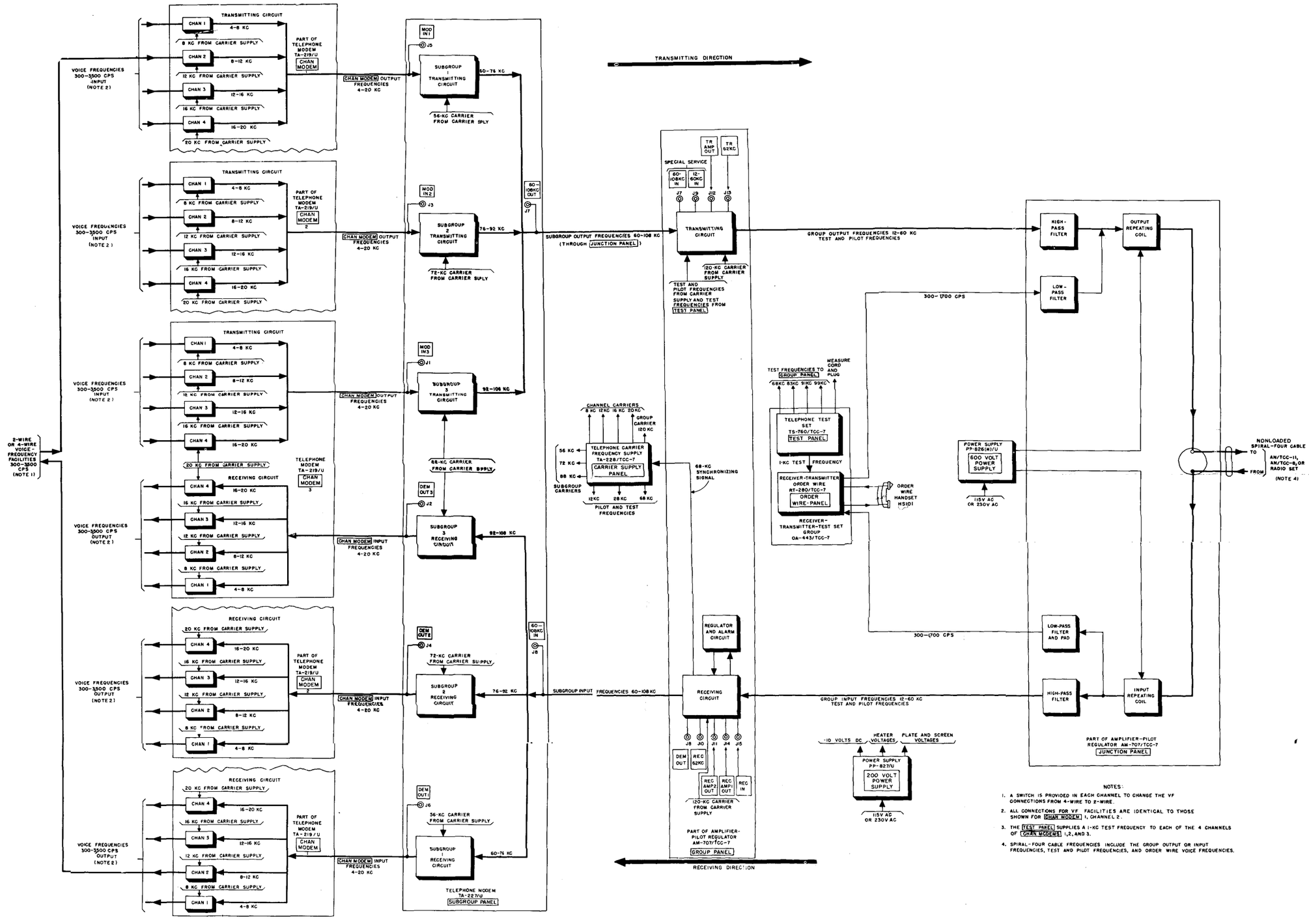

Figure 26. Telephone Terminal AN/TCC-7, block diagram.

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